

Work Order ID 86985

\*86985\*

Page 1

Friday, July 06, 2012 1:03:29 PM

Item ID: D412-664-203 Accept \*N900040100\* Setup Start \*NS1\*  
 Revision ID: Stop \*NS2\*  
 Item Name: Crosstube Aft  
 Start Date: 7/6/2012 Start Qty: 1.00 \*1\* Cust Item ID:  
 Required Date: 7/18/2012 Req'd Qty: 1.00 \*1\* Customer:  
 Reference:

Approvals: Process Plan:      Date: 12-07-16 Tooling:      Date:       
 QC:      Date:      SPC (Y/N):      Date:       
 Run Start \*NR1\*  
 Stop \*NR2\*

| Sequence ID/<br>Work Center ID | Operation<br>Description | Set Up/<br>Run Hours | Tool ID | Tool # | Plan<br>Code | Accept<br>Qty | Reject<br>Qty | Reject<br>Number | Insp.<br>Stamp |
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|

| Draw Nbr     | Revision Nbr |
|--------------|--------------|
| D412-664-243 | E/DEO        |

100

\*100\*

DC

Document Control

DOCUMENT CONTROL

Memo

Photocopy bluefile and create labels as per PPP D412-664-203 CHG 008

0.00

0.00

DAS  
16  
2-23

CHG 009  
★ SEE L/D CHG ATTACHED

ML 12-8-27

110

\*110\*

Packaging

Packaging

Packaging

Memo

0.00

0.00

PM 12-7-24

120

\*120\*

CNC Bend 2

CNC Alpha 160 Bender

★ PTO

BENDING MACHINE - CROSSTUBES

Memo

Bend tube as per Dwg D412-664-243 using CNC bender program 412-aft and Folio FT010

0.00

0.00

DP 12-7-24  
SAD

W/O: 86985

## WORK ORDER CHANGES

| DATE | STEP | PROCEDURE CHANGE | By | Date | Qty | Approval<br>Chief Eng /<br>Prod Mgr | Approval<br>QC Inspector |
|------|------|------------------|----|------|-----|-------------------------------------|--------------------------|
|      |      |                  |    |      |     |                                     |                          |
|      |      |                  |    |      |     |                                     |                          |

Part No: D412-664-203 PAR #: \_\_\_\_\_ Fault Category: V-tube NCR: Yes No DQA: AK Date: 12/09/12  
 Resolution: \_\_\_\_\_ Disposition: use on N QA: N/C Closed: AK Date: 2/9/14

NCR: 12-1801

## WORK ORDER NON-CONFORMANCE (NCR)

| DATE    | STEP | Description of NC<br>Section A              | Corrective Action Section B  |                                 |                             | Verification<br>Section C    | Approval<br>Chief Eng        | Approval<br>QC Inspector     |
|---------|------|---------------------------------------------|------------------------------|---------------------------------|-----------------------------|------------------------------|------------------------------|------------------------------|
|         |      |                                             | Initial<br>Chief Eng         | Action Description<br>Chief Eng | Sign &<br>Date              |                              |                              |                              |
| 12.7.26 | 120  | CRUSHING AFTER BENDING<br>IS OVER TOLERANCE | DAS<br>12<br>2-89<br>12.7.26 | ACCEPTABLE PER ATTACHED S.R.    | AK<br>12<br>2-89<br>12.7.26 | DAS<br>16<br>2-89<br>1706/12 | DAS<br>12<br>2-89<br>12/1/12 | DAS<br>16<br>2-89<br>12/6/12 |
|         |      |                                             |                              |                                 |                             |                              |                              |                              |
|         |      |                                             |                              |                                 |                             |                              |                              |                              |

NOTE: Date &amp; initial all entries

NCR: Yes / No

## WORK ORDER NON-CONFORMANCE / UPDATE

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

|                                                                                            |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                      |                                    |                                    |                                      |                                    |                                    |                                            |                                  |                                        |                                    |                                              |                                |                                    |                                    |                                   |  |
|--------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------------------------------------|------------------------------------|--------------------------------------|------------------------------------|------------------------------------|--------------------------------------------|----------------------------------|----------------------------------------|------------------------------------|----------------------------------------------|--------------------------------|------------------------------------|------------------------------------|-----------------------------------|--|
| Work Order: <u><del>86985</del> 86985</u><br>Part No. <u>D412-664-203</u><br>NCR No. _____ | <b>DISPOSITION</b><br>Rework <input type="checkbox"/><br>Scrap <input type="checkbox"/><br>Use-as-is <input type="checkbox"/><br>Work Order Update <input checked="" type="checkbox"/><br><i>THIS W/O ONLY</i> | <b>AGAINST DEPARTMENT/PROCESS</b><br><table style="width:100%;"> <tr> <td>Skid-tube <input type="checkbox"/></td> <td>Crosstube <input type="checkbox"/></td> <td>Water Jet <input type="checkbox"/></td> <td>Engineering <input type="checkbox"/></td> </tr> <tr> <td>Machining <input type="checkbox"/></td> <td>Small Fab <input type="checkbox"/></td> <td>Prod. Eng. Coord. <input type="checkbox"/></td> <td>Quality <input type="checkbox"/></td> </tr> <tr> <td>Thermoforming <input type="checkbox"/></td> <td>Finishing <input type="checkbox"/></td> <td>Rec/Store/Packaging <input type="checkbox"/></td> <td>Other <input type="checkbox"/></td> </tr> <tr> <td>Large Fab <input type="checkbox"/></td> <td>Composite <input type="checkbox"/></td> <td>Supplier <input type="checkbox"/></td> <td></td> </tr> </table> | Skid-tube <input type="checkbox"/>   | Crosstube <input type="checkbox"/> | Water Jet <input type="checkbox"/> | Engineering <input type="checkbox"/> | Machining <input type="checkbox"/> | Small Fab <input type="checkbox"/> | Prod. Eng. Coord. <input type="checkbox"/> | Quality <input type="checkbox"/> | Thermoforming <input type="checkbox"/> | Finishing <input type="checkbox"/> | Rec/Store/Packaging <input type="checkbox"/> | Other <input type="checkbox"/> | Large Fab <input type="checkbox"/> | Composite <input type="checkbox"/> | Supplier <input type="checkbox"/> |  |
| Skid-tube <input type="checkbox"/>                                                         | Crosstube <input type="checkbox"/>                                                                                                                                                                             | Water Jet <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Engineering <input type="checkbox"/> |                                    |                                    |                                      |                                    |                                    |                                            |                                  |                                        |                                    |                                              |                                |                                    |                                    |                                   |  |
| Machining <input type="checkbox"/>                                                         | Small Fab <input type="checkbox"/>                                                                                                                                                                             | Prod. Eng. Coord. <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Quality <input type="checkbox"/>     |                                    |                                    |                                      |                                    |                                    |                                            |                                  |                                        |                                    |                                              |                                |                                    |                                    |                                   |  |
| Thermoforming <input type="checkbox"/>                                                     | Finishing <input type="checkbox"/>                                                                                                                                                                             | Rec/Store/Packaging <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Other <input type="checkbox"/>       |                                    |                                    |                                      |                                    |                                    |                                            |                                  |                                        |                                    |                                              |                                |                                    |                                    |                                   |  |
| Large Fab <input type="checkbox"/>                                                         | Composite <input type="checkbox"/>                                                                                                                                                                             | Supplier <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                      |                                    |                                    |                                      |                                    |                                    |                                            |                                  |                                        |                                    |                                              |                                |                                    |                                    |                                   |  |

| Root Cause    | Date    | Step | Qty | Description of work order update or Non-conformance | Initial Chief Eng | Action Description                                                                        | Sign & Date    | Verification   | QC Inspector   |
|---------------|---------|------|-----|-----------------------------------------------------|-------------------|-------------------------------------------------------------------------------------------|----------------|----------------|----------------|
| Doc/Data      | 12/3/13 | 100  | 1   | KIT IS NOW CHG 009 WITH NEW CHAFING SHIELD          | DAS<br>12/3/13    | PAPERWORK / LABELS TO SAY CHG 009                                                         | N/A            | N/A            | DAS<br>12/3/13 |
| Equip/Tooling |         |      |     |                                                     |                   |                                                                                           |                |                |                |
| Operator      |         |      |     |                                                     |                   |                                                                                           |                |                |                |
| Material      |         |      |     |                                                     |                   |                                                                                           |                |                |                |
| Setup         |         |      |     |                                                     |                   |                                                                                           |                |                |                |
| Other         | 12/3/13 | 100  | 1   | PAPERWORK NEEDS COPY OF DSI 9629 Rev. A.            | DAS<br>12/3/13    | Add copy of DSI to <del>CHAFING</del> Paperwork (bluefile) OR SEND TO CUSTOMER AFTERWARDS | DAS<br>12/3/13 | DAS<br>12/3/13 | DAS<br>12/3/13 |
| Process       |         |      |     |                                                     |                   |                                                                                           |                |                |                |
| Supplier      |         |      |     |                                                     |                   |                                                                                           |                |                |                |
| Training      |         |      |     |                                                     |                   |                                                                                           |                |                |                |
| Unapproved    |         |      |     |                                                     |                   |                                                                                           |                |                |                |

## FAULT CATEGORY

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Landing Gear</b><br><input type="checkbox"/> Bending<br><input type="checkbox"/> Centre Not Concentric to O/S<br><input type="checkbox"/> Cracks<br><input type="checkbox"/> Crushed/Crimped.<br><input type="checkbox"/> Cuffs<br><input type="checkbox"/> Heat Treat<br><input type="checkbox"/> Inspection Strip in Tube<br><input type="checkbox"/> Ripples in Bend<br><input type="checkbox"/> Torque Waves in Extrusion<br><input type="checkbox"/> Turning Sequence<br><input type="checkbox"/> Wave/Twist in Tube | <b>General</b><br><input type="checkbox"/> Bend<br><input type="checkbox"/> BOM/Route<br><input type="checkbox"/> Broken/Damaged<br><input type="checkbox"/> Burrs<br><input type="checkbox"/> Contamination<br><input type="checkbox"/> Countersink<br><input type="checkbox"/> Cut Too Short<br><input type="checkbox"/> Drill Holes<br><input type="checkbox"/> Drawing<br><input type="checkbox"/> Finish<br><input type="checkbox"/> Folio | <input type="checkbox"/> Grain<br><input type="checkbox"/> Hardware<br><input type="checkbox"/> Inspection Incomplete<br><input type="checkbox"/> Instructions Incomplete/Unclear<br><input type="checkbox"/> Maintenance<br><input type="checkbox"/> Mislabeled<br><input type="checkbox"/> Misread<br><input type="checkbox"/> Offset<br><input type="checkbox"/> Out of Calibration<br><input type="checkbox"/> Out of Sequence<br><input type="checkbox"/> Outside Dimensions |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> Ovalized<br><input type="checkbox"/> Over/Under tolerance<br><input type="checkbox"/> Part Incorrect<br><input type="checkbox"/> Part Lost/Missing<br><input type="checkbox"/> Part Moved<br><input type="checkbox"/> Positioned Wrong<br><input type="checkbox"/> Power Loss/Surge | <input type="checkbox"/> Pressure/Forced<br><input type="checkbox"/> Temperature/Cure<br><input type="checkbox"/> Weld<br><input type="checkbox"/> Wrong Stock Pulled<br><input type="checkbox"/> Other |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**Work Order ID 86985**

Friday, July 06, 2012 1:03:29 PM

**\*86985\***

Page 2

Item ID: D412-664-203

Accept

**\*N900040100\***Setup Start **\*NS1\***

Revision ID:

Stop **\*NS2\***

Item Name: Crosstube Aft

Start Date: 7/6/2012 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 7/18/2012 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start **\*NR1\***

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop **\*NR2\***

| Sequence ID/<br>Work Center ID | Operation<br>Description | Set Up/<br>Run Hours | Tool ID | Tool # | Plan<br>Code | Accept<br>Qty | Reject<br>Qty | Reject<br>Number | Insp.<br>Stamp |
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|

130

QC15- Crosstube Dimensional Check

0.00

**\*130\***

QC

Memo

Quality Control

DAS  
15  
0.00-0.00 12/7/12

140

Crosstubes

0.00

**\*140\***

Crosstubes

Memo

0.00

Crosstubes

1-Drill pilot holes in tube as per Dwg D412-664-243 using drill Jig DT8550 &amp; DT8551 and drill table DT8577 using #9 holes as per QSI 10 to install towers.

2-Ream hole to finish size in tube as per Dwg D412-664-243 using drill Jig DT8550 &amp; DT8551. Check dimensions between holes, both sides on both cuffs, to ensure alignment with saddle holes.

3-SCRIBE PART # &amp; BATCH #

4- \*\*\* WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE\*\*\* Deburr &amp; Inspect for surface damage. Repair damage within limits as per Dwg D412-664-243

MO / RM

12-7-26

MO

12-7-30

| W/O: |      | WORK ORDER CHANGES |    |      |     |                                     |                          |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE   | By | Date | Qty | Approval<br>Chief Eng /<br>Prod Mgr | Approval<br>QC Inspector |
|      |      |                    |    |      |     |                                     |                          |
|      |      |                    |    |      |     |                                     |                          |

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

| NCR: |      | WORK ORDER NON-CONFORMANCE (NCR) |                             |                                 |                |                           |                       |                          |
|------|------|----------------------------------|-----------------------------|---------------------------------|----------------|---------------------------|-----------------------|--------------------------|
| DATE | STEP | Description of NC<br>Section A   | Corrective Action Section B |                                 |                | Verification<br>Section C | Approval<br>Chief Eng | Approval<br>QC Inspector |
|      |      |                                  | Initial<br>Chief Eng        | Action Description<br>Chief Eng | Sign &<br>Date |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |

**NOTE:** Date & initial all entries

**Work Order ID 86985****\*86985\***

Page 3

Friday, July 06, 2012 1:03:30 PM

Item ID: D412-664-203

Accept

**\*N900040100\***Setup Start **\*NS1\***

Revision ID:

Stop **\*NS2\***

Item Name: Crosstube Aft

Start Date: 7/6/2012 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 7/18/2012 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start **\*NR1\***

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop **\*NR2\***

| Sequence ID/<br>Work Center ID | Operation<br>Description | Set Up/<br>Run Hours | Tool ID | Tool # | Plan<br>Code | Accept<br>Qty | Reject<br>Qty | Reject<br>Number | Insp.<br>Stamp |
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|

160

QC5- Inspect part completeness to step on W/O

0.00

**\*160\***

QC

Memo

0.00

Quality Control

\*\*\* WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE\*\*\*

170

0.00

**\*170\***

HandFXtube

Memo

0.00

Hand Finishing Crosstubes

\*\*\* WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE\*\*\*

1- CLEAN CROSSTUBE WITH WASH'N WIPE

180

Outsource process - NDT per QSI038 4.1

0.00

**\*180\***

Outsource2

Memo

0.00

Outsource process - NDT

\*\*\* WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE\*\*\*

Liquid Penetrant Inspection as per QSI 038Or  
Issue P/O: 17609 PI as per ASTM 1417  
Level 2 Attach copy of NDT results to work order

A2 12-8-3

12-08-3

| W/O: |      | WORK ORDER CHANGES |    |      |     |                                     |                          |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE   | By | Date | Qty | Approval<br>Chief Eng /<br>Prod Mgr | Approval<br>QC Inspector |
|      |      |                    |    |      |     |                                     |                          |
|      |      |                    |    |      |     |                                     |                          |

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

| NCR: |      | WORK ORDER NON-CONFORMANCE (NCR) |                             |                                 |                |                           |                       |                          |
|------|------|----------------------------------|-----------------------------|---------------------------------|----------------|---------------------------|-----------------------|--------------------------|
| DATE | STEP | Description of NC<br>Section A   | Corrective Action Section B |                                 |                | Verification<br>Section C | Approval<br>Chief Eng | Approval<br>QC Inspector |
|      |      |                                  | Initial<br>Chief Eng        | Action Description<br>Chief Eng | Sign &<br>Date |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |

**NOTE:** Date & initial all entries

**Work Order ID 86985**

Friday, July 06, 2012 1:03:30 PM

**\*86985\***

Page 4

Item ID: D412-664-203

Accept

**\*N900040100\***Setup Start **\*NS1\***

Revision ID:

Stop **\*NS2\***

Item Name: Crosstube Aft

Start Date: 7/6/2012 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 7/18/2012 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start **\*NR1\***

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop **\*NR2\***

| Sequence ID/<br>Work Center ID | Operation<br>Description | Set Up/<br>Run Hours | Tool ID | Tool # | Plan<br>Code | Accept<br>Qty | Reject<br>Qty | Reject<br>Number | Insp.<br>Stamp |
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|

190

0.00

**\*190\***

Packaging

Packaging

Memo

0.00

Packaging

\*\*\* WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE\*\*\*

Inspect for transit damage

Ensure copy of NDT results attached to work order.

*12/8/30*

200

QC5- Inspect part completeness to step on W/O

0.00

**\*200\***

QC

Memo

0.00

Quality Control

\*\*\* WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE\*\*\*

Inspect for damage &amp; ensure results are as per Dwg D412-664-203

*DAS 16 12/8/30*

203

0.00

**\*203\***

HandFXtube

Memo

0.00

Hand Finishing Crosstubes

\*\*\* WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE\*\*\*

1- PRESSURE WASH AND THEN USE WASH'N WIPE TO CLEAN CROSSTUBE BEFORE CHEMICAL CONVERSION

*12-8-3*



| W/O: |      | WORK ORDER CHANGES |    |      |     |                                     |                          |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE   | By | Date | Qty | Approval<br>Chief Eng /<br>Prod Mgr | Approval<br>QC Inspector |
|      |      |                    |    |      |     |                                     |                          |
|      |      |                    |    |      |     |                                     |                          |

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

| NCR: |      | WORK ORDER NON-CONFORMANCE (NCR) |                             |                                 |                |                           |                       |                          |
|------|------|----------------------------------|-----------------------------|---------------------------------|----------------|---------------------------|-----------------------|--------------------------|
| DATE | STEP | Description of NC<br>Section A   | Corrective Action Section B |                                 |                | Verification<br>Section C | Approval<br>Chief Eng | Approval<br>QC Inspector |
|      |      |                                  | Initial<br>Chief Eng        | Action Description<br>Chief Eng | Sign &<br>Date |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |

**NOTE:** Date & initial all entries

**Work Order ID 86985**

Friday, July 06, 2012 1:03:30 PM

**\*86985\***

Page 5

Item ID: D412-664-203

Accept

**\*N900040100\***Setup Start **\*NS1\***

Revision ID:

Stop **\*NS2\***

Item Name: Crosstube Aft

Start Date: 7/6/2012 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 7/18/2012 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start **\*NR1\***

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop **\*NR2\***

| Sequence ID/<br>Work Center ID | Operation<br>Description | Set Up/<br>Run Hours | Tool ID | Tool # | Plan<br>Code | Accept<br>Qty | Reject<br>Qty | Reject<br>Number | Insp.<br>Stamp |
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|

205

QC7-Inspect Chemical Conversion Coat

0.00

**\*205\***

QC

Memo

0.00

Quality Control

\*\*\* WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE\*\*\*

210

0.00

**\*210\***

SprayPaint

SprayPaint

Memo

0.00

Spray Painting

\*\*\* WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE\*\*\*

\*\*\*Mask underside of crosstube as shown\*\*\*

1-Prime inside and outside crosstube as per QSI 005 4.2

2-Paint outside crosstube with White Imron as per DEO D412-664-243 and QSI 005 4.2

PRIME: 121746  
Start Time: 1:15  
Finish Time: 2:00  
PAINT: 122522  
Start Time: 6:30  
Finish Time: 7:15

DAS  
18  
12/6/12

AB 12-8-7

# Dart Aerospace Ltd

| W/O: |      | WORK ORDER CHANGES |    |      |     |                                     |                          |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE   | By | Date | Qty | Approval<br>Chief Eng /<br>Prod Mgr | Approval<br>QC Inspector |
|      |      |                    |    |      |     |                                     |                          |
|      |      |                    |    |      |     |                                     |                          |

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

| NCR: |      | WORK ORDER NON-CONFORMANCE (NCR) |                             |                                 |                |                           |                       |                          |
|------|------|----------------------------------|-----------------------------|---------------------------------|----------------|---------------------------|-----------------------|--------------------------|
| DATE | STEP | Description of NC<br>Section A   | Corrective Action Section B |                                 |                | Verification<br>Section C | Approval<br>Chief Eng | Approval<br>QC Inspector |
|      |      |                                  | Initial<br>Chief Eng        | Action Description<br>Chief Eng | Sign &<br>Date |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |

**NOTE:** Date & initial all entries

**Work Order ID 86985**

Friday, July 06, 2012 1:03:30 PM

**\*86985\***

Page 6

Item ID: D412-664-203

Accept

**\*N900040100\***Setup Start **\*NS1\***

Revision ID:

Stop **\*NS2\***

Item Name: Crosstube Aft

Start Date: 7/6/2012 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 7/18/2012 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start **\*NR1\***

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop **\*NR2\***

| Sequence ID/<br>Work Center ID | Operation<br>Description | Set Up/<br>Run Hours | Tool ID | Tool # | Plan<br>Code | Accept<br>Qty | Reject<br>Qty | Reject<br>Number | Insp.<br>Stamp |
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|

220

QC14- Inspect Spray Paint

0.00

**\*220\***

QC

Quality Control

Memo

0.00

Then, Wrap in plastic bag to protect from scratches

230

Crosstubes

0.00

**\*230\***

Crosstubes

Crosstubes

Memo

0.00

Assemble as per Dwg D412-664-203

★ SEE  
ATTACHED  
W/O DEVIATION

1- Install chafing shield as per DEO D412-664-243. Top holes should be facing up.

A/R Proseal 890 Batch: 122441  
EXP: 1/13

2- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe

3- Install support with Scotch-Weld DP460 and install clamps as per DEO Dwg D12-664-243 using installation jig DT9024. Torque clamps as per dwg

A/R Scotch-Weld DP460 Batch: 121368  
EXP: 13-4-13

**Dart Aerospace Ltd**

| W/O: |      | WORK ORDER CHANGES |    |      |     |                                     |                          |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE   | By | Date | Qty | Approval<br>Chief Eng /<br>Prod Mgr | Approval<br>QC Inspector |
|      |      |                    |    |      |     |                                     |                          |
|      |      |                    |    |      |     |                                     |                          |

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_  
 Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

| NCR: |      | WORK ORDER NON-CONFORMANCE (NCR) |                             |                                 |                |                           |                       |                          |
|------|------|----------------------------------|-----------------------------|---------------------------------|----------------|---------------------------|-----------------------|--------------------------|
| DATE | STEP | Description of NC<br>Section A   | Corrective Action Section B |                                 |                | Verification<br>Section C | Approval<br>Chief Eng | Approval<br>QC Inspector |
|      |      |                                  | Initial<br>Chief Eng        | Action Description<br>Chief Eng | Sign &<br>Date |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |

**NOTE:** Date & initial all entries

NCR: Yes / No

## WORK ORDER NON-CONFORMANCE / UPDATE

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

|                                                                           |                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                      |                                    |                                    |                                      |                                    |                                    |                                            |                                  |                                        |                                    |                                              |                                |                                    |                                    |                                   |  |
|---------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------------------------------------|------------------------------------|--------------------------------------|------------------------------------|------------------------------------|--------------------------------------------|----------------------------------|----------------------------------------|------------------------------------|----------------------------------------------|--------------------------------|------------------------------------|------------------------------------|-----------------------------------|--|
| Work Order: <u>86985</u><br>Part No. <u>D412-664-203</u><br>NCR No. _____ | <b>DISPOSITION</b><br>Rework <input type="checkbox"/><br>Scrap <input type="checkbox"/><br>Use-as-is <input type="checkbox"/><br>Work Order Update <input checked="" type="checkbox"/> <i>THIS W/O ONLY</i> | <b>AGAINST DEPARTMENT/PROCESS</b><br><table style="width:100%; font-size: small;"> <tr> <td>Skid-tube <input type="checkbox"/></td> <td>Crosstube <input type="checkbox"/></td> <td>Water Jet <input type="checkbox"/></td> <td>Engineering <input type="checkbox"/></td> </tr> <tr> <td>Machining <input type="checkbox"/></td> <td>Small Fab <input type="checkbox"/></td> <td>Prod. Eng. Coord. <input type="checkbox"/></td> <td>Quality <input type="checkbox"/></td> </tr> <tr> <td>Thermoforming <input type="checkbox"/></td> <td>Finishing <input type="checkbox"/></td> <td>Rec/Store/Packaging <input type="checkbox"/></td> <td>Other <input type="checkbox"/></td> </tr> <tr> <td>Large Fab <input type="checkbox"/></td> <td>Composite <input type="checkbox"/></td> <td>Supplier <input type="checkbox"/></td> <td></td> </tr> </table> | Skid-tube <input type="checkbox"/>   | Crosstube <input type="checkbox"/> | Water Jet <input type="checkbox"/> | Engineering <input type="checkbox"/> | Machining <input type="checkbox"/> | Small Fab <input type="checkbox"/> | Prod. Eng. Coord. <input type="checkbox"/> | Quality <input type="checkbox"/> | Thermoforming <input type="checkbox"/> | Finishing <input type="checkbox"/> | Rec/Store/Packaging <input type="checkbox"/> | Other <input type="checkbox"/> | Large Fab <input type="checkbox"/> | Composite <input type="checkbox"/> | Supplier <input type="checkbox"/> |  |
| Skid-tube <input type="checkbox"/>                                        | Crosstube <input type="checkbox"/>                                                                                                                                                                          | Water Jet <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Engineering <input type="checkbox"/> |                                    |                                    |                                      |                                    |                                    |                                            |                                  |                                        |                                    |                                              |                                |                                    |                                    |                                   |  |
| Machining <input type="checkbox"/>                                        | Small Fab <input type="checkbox"/>                                                                                                                                                                          | Prod. Eng. Coord. <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Quality <input type="checkbox"/>     |                                    |                                    |                                      |                                    |                                    |                                            |                                  |                                        |                                    |                                              |                                |                                    |                                    |                                   |  |
| Thermoforming <input type="checkbox"/>                                    | Finishing <input type="checkbox"/>                                                                                                                                                                          | Rec/Store/Packaging <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Other <input type="checkbox"/>       |                                    |                                    |                                      |                                    |                                    |                                            |                                  |                                        |                                    |                                              |                                |                                    |                                    |                                   |  |
| Large Fab <input type="checkbox"/>                                        | Composite <input type="checkbox"/>                                                                                                                                                                          | Supplier <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                      |                                    |                                    |                                      |                                    |                                    |                                            |                                  |                                        |                                    |                                              |                                |                                    |                                    |                                   |  |

| Root Cause    |  | Date    | Step | Qty | Description of work order update or Non-conformance                                                       | Initial Chief Eng   | Action Description                                                                                                                 | Sign & Date | Verification        | QC Inspector        |
|---------------|--|---------|------|-----|-----------------------------------------------------------------------------------------------------------|---------------------|------------------------------------------------------------------------------------------------------------------------------------|-------------|---------------------|---------------------|
| Doc/Data      |  | 12/8/13 | 236  | 1   | INSTALL CHAFING SHIELD MADE TO D3189 Rev. PC1. INSTALL PER ATTACHED PRELIM COPY OF DED D412-664-243 -E-4. | DAS 12 8-89 12/8/13 | OK to install & ship crosstube made to D3189 Rev. PC1. Change is minor and parts approved to D3189 Rev. B with accepted deviations | AR 12-8-25  | DAS 16 8-89 12/8/12 | DAS 16 8-89 12/8/12 |
| Equip/Tooling |  |         |      |     |                                                                                                           |                     |                                                                                                                                    |             |                     |                     |
| Operator      |  |         |      |     |                                                                                                           |                     |                                                                                                                                    |             |                     |                     |
| Material      |  |         |      |     |                                                                                                           |                     |                                                                                                                                    |             |                     |                     |
| Setup         |  |         |      |     |                                                                                                           |                     |                                                                                                                                    |             |                     |                     |
| Other         |  |         |      |     |                                                                                                           |                     |                                                                                                                                    |             |                     |                     |
| Process       |  |         |      |     |                                                                                                           |                     |                                                                                                                                    |             |                     |                     |
| Supplier      |  |         |      |     |                                                                                                           |                     |                                                                                                                                    |             |                     |                     |
| Training      |  |         |      |     |                                                                                                           |                     |                                                                                                                                    |             |                     |                     |
| Unapproved    |  |         |      |     |                                                                                                           |                     |                                                                                                                                    |             |                     |                     |

## FAULT CATEGORY

| Landing Gear                                          | General                                 | Other                                                                                                                                                                                                                                                                                                        |
|-------------------------------------------------------|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> Bending                      | <input type="checkbox"/> Bend           | <input type="checkbox"/> Grain                                                                                                                                                                                                                                                                               |
| <input type="checkbox"/> Centre Not Concentric to O/S | <input type="checkbox"/> BOM/Route      | <input type="checkbox"/> Hardware                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/> Cracks                       | <input type="checkbox"/> Broken/Damaged | <input type="checkbox"/> Inspection Incomplete                                                                                                                                                                                                                                                               |
| <input type="checkbox"/> Crushed/Crimped.             | <input type="checkbox"/> Burrs          | <input type="checkbox"/> Instructions Incomplete/Unclear                                                                                                                                                                                                                                                     |
| <input type="checkbox"/> Cuffs                        | <input type="checkbox"/> Contamination  | <input type="checkbox"/> Maintenance                                                                                                                                                                                                                                                                         |
| <input type="checkbox"/> Heat Treat                   | <input type="checkbox"/> Countersink    | <input type="checkbox"/> Misabeled                                                                                                                                                                                                                                                                           |
| <input type="checkbox"/> Inspection Strip in Tube     | <input type="checkbox"/> Cut Too Short  | <input type="checkbox"/> Misread                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/> Ripples in Bend              | <input type="checkbox"/> Drill Holes    | <input type="checkbox"/> Offset                                                                                                                                                                                                                                                                              |
| <input type="checkbox"/> Torque Waves in Extrusion    | <input type="checkbox"/> Drawing        | <input type="checkbox"/> Out of Calibration                                                                                                                                                                                                                                                                  |
| <input type="checkbox"/> Turning Sequence             | <input type="checkbox"/> Finish         | <input type="checkbox"/> Out of Sequence                                                                                                                                                                                                                                                                     |
| <input type="checkbox"/> Wave/Twist in Tube           | <input type="checkbox"/> Folio          | <input type="checkbox"/> Outside Dimensions                                                                                                                                                                                                                                                                  |
|                                                       |                                         | <input type="checkbox"/> Ovalized<br><input type="checkbox"/> Over/Under tolerance<br><input type="checkbox"/> Part Incorrect<br><input type="checkbox"/> Part Lost/Missing<br><input type="checkbox"/> Part Moved<br><input type="checkbox"/> Positioned Wrong<br><input type="checkbox"/> Power Loss/Surge |
|                                                       |                                         | <input type="checkbox"/> Pressure/Forced<br><input type="checkbox"/> Temperature/Cure<br><input type="checkbox"/> Weld<br><input type="checkbox"/> Wrong Stock Pulled<br><input type="checkbox"/> Other                                                                                                      |

NCR: Yes / No

## WORK ORDER NON-CONFORMANCE / UPDATE

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

|                                                                           |                                    |                                              |                                      |                                                                                                                                                                                        |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |               |              |              |  |  |                                    |                                    |                                    |                                      |                                    |                                    |                                            |                                  |                                        |                                    |                                              |                                |                                    |                                    |                                   |  |
|---------------------------------------------------------------------------|------------------------------------|----------------------------------------------|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|--------------|--------------|--|--|------------------------------------|------------------------------------|------------------------------------|--------------------------------------|------------------------------------|------------------------------------|--------------------------------------------|----------------------------------|----------------------------------------|------------------------------------|----------------------------------------------|--------------------------------|------------------------------------|------------------------------------|-----------------------------------|--|
| Work Order: <u>86985</u><br>Part No. <u>D412-664-203</u><br>NCR No. _____ |                                    |                                              |                                      | <b>DISPOSITION</b><br>Rework <input type="checkbox"/><br>Scrap <input type="checkbox"/><br>Use-as-is <input type="checkbox"/><br>Work Order Update <input checked="" type="checkbox"/> |                   | <b>AGAINST DEPARTMENT/PROCESS</b><br><table style="width:100%; font-size: small;"> <tr> <td>Skid-tube <input type="checkbox"/></td> <td>Crosstube <input type="checkbox"/></td> <td>Water Jet <input type="checkbox"/></td> <td>Engineering <input type="checkbox"/></td> </tr> <tr> <td>Machining <input type="checkbox"/></td> <td>Small Fab <input type="checkbox"/></td> <td>Prod. Eng. Coord. <input type="checkbox"/></td> <td>Quality <input type="checkbox"/></td> </tr> <tr> <td>Thermoforming <input type="checkbox"/></td> <td>Finishing <input type="checkbox"/></td> <td>Rec/Store/Packaging <input type="checkbox"/></td> <td>Other <input type="checkbox"/></td> </tr> <tr> <td>Large Fab <input type="checkbox"/></td> <td>Composite <input type="checkbox"/></td> <td>Supplier <input type="checkbox"/></td> <td></td> </tr> </table> |               |              |              |  |  | Skid-tube <input type="checkbox"/> | Crosstube <input type="checkbox"/> | Water Jet <input type="checkbox"/> | Engineering <input type="checkbox"/> | Machining <input type="checkbox"/> | Small Fab <input type="checkbox"/> | Prod. Eng. Coord. <input type="checkbox"/> | Quality <input type="checkbox"/> | Thermoforming <input type="checkbox"/> | Finishing <input type="checkbox"/> | Rec/Store/Packaging <input type="checkbox"/> | Other <input type="checkbox"/> | Large Fab <input type="checkbox"/> | Composite <input type="checkbox"/> | Supplier <input type="checkbox"/> |  |
| Skid-tube <input type="checkbox"/>                                        | Crosstube <input type="checkbox"/> | Water Jet <input type="checkbox"/>           | Engineering <input type="checkbox"/> |                                                                                                                                                                                        |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |               |              |              |  |  |                                    |                                    |                                    |                                      |                                    |                                    |                                            |                                  |                                        |                                    |                                              |                                |                                    |                                    |                                   |  |
| Machining <input type="checkbox"/>                                        | Small Fab <input type="checkbox"/> | Prod. Eng. Coord. <input type="checkbox"/>   | Quality <input type="checkbox"/>     |                                                                                                                                                                                        |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |               |              |              |  |  |                                    |                                    |                                    |                                      |                                    |                                    |                                            |                                  |                                        |                                    |                                              |                                |                                    |                                    |                                   |  |
| Thermoforming <input type="checkbox"/>                                    | Finishing <input type="checkbox"/> | Rec/Store/Packaging <input type="checkbox"/> | Other <input type="checkbox"/>       |                                                                                                                                                                                        |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |               |              |              |  |  |                                    |                                    |                                    |                                      |                                    |                                    |                                            |                                  |                                        |                                    |                                              |                                |                                    |                                    |                                   |  |
| Large Fab <input type="checkbox"/>                                        | Composite <input type="checkbox"/> | Supplier <input type="checkbox"/>            |                                      |                                                                                                                                                                                        |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |               |              |              |  |  |                                    |                                    |                                    |                                      |                                    |                                    |                                            |                                  |                                        |                                    |                                              |                                |                                    |                                    |                                   |  |
| Root Cause                                                                | Date                               | Step                                         | Qty                                  | Description of work order update or Non-conformance                                                                                                                                    | Initial Chief Eng | Action Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Sign & Date   | Verification | QC Inspector |  |  |                                    |                                    |                                    |                                      |                                    |                                    |                                            |                                  |                                        |                                    |                                              |                                |                                    |                                    |                                   |  |
| Doc/Data <input type="checkbox"/>                                         | 12/8/23                            | 230                                          | 1                                    | REMOVE <del>KA</del> CHAFING SHIELD INSTALLED PER 12/8/23 INSTRUCTION BECAUSE KA REQUIRES <del>KA</del> OVERLAP AT 60"                                                                 | DAW<br>12/29      | REMOVE AND ENSURE THERE IS NO DAMAGE TO TUBE/FINISH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | AA<br>12-8-30 | <br>120805   | <br>120905   |  |  |                                    |                                    |                                    |                                      |                                    |                                    |                                            |                                  |                                        |                                    |                                              |                                |                                    |                                    |                                   |  |
| Equip/Tooling <input type="checkbox"/>                                    |                                    |                                              |                                      |                                                                                                                                                                                        |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |               |              |              |  |  |                                    |                                    |                                    |                                      |                                    |                                    |                                            |                                  |                                        |                                    |                                              |                                |                                    |                                    |                                   |  |
| Operator <input type="checkbox"/>                                         |                                    |                                              |                                      |                                                                                                                                                                                        |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |               |              |              |  |  |                                    |                                    |                                    |                                      |                                    |                                    |                                            |                                  |                                        |                                    |                                              |                                |                                    |                                    |                                   |  |
| Material <input type="checkbox"/>                                         |                                    |                                              |                                      |                                                                                                                                                                                        |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |               |              |              |  |  |                                    |                                    |                                    |                                      |                                    |                                    |                                            |                                  |                                        |                                    |                                              |                                |                                    |                                    |                                   |  |
| Setup <input type="checkbox"/>                                            |                                    |                                              |                                      |                                                                                                                                                                                        |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |               |              |              |  |  |                                    |                                    |                                    |                                      |                                    |                                    |                                            |                                  |                                        |                                    |                                              |                                |                                    |                                    |                                   |  |
| Other <input type="checkbox"/>                                            |                                    |                                              |                                      |                                                                                                                                                                                        |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |               |              |              |  |  |                                    |                                    |                                    |                                      |                                    |                                    |                                            |                                  |                                        |                                    |                                              |                                |                                    |                                    |                                   |  |
| Process <input type="checkbox"/>                                          |                                    |                                              |                                      |                                                                                                                                                                                        |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |               |              |              |  |  |                                    |                                    |                                    |                                      |                                    |                                    |                                            |                                  |                                        |                                    |                                              |                                |                                    |                                    |                                   |  |
| Supplier <input type="checkbox"/>                                         |                                    |                                              |                                      |                                                                                                                                                                                        |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |               |              |              |  |  |                                    |                                    |                                    |                                      |                                    |                                    |                                            |                                  |                                        |                                    |                                              |                                |                                    |                                    |                                   |  |
| Training <input type="checkbox"/>                                         |                                    |                                              |                                      |                                                                                                                                                                                        |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |               |              |              |  |  |                                    |                                    |                                    |                                      |                                    |                                    |                                            |                                  |                                        |                                    |                                              |                                |                                    |                                    |                                   |  |
| Unapproved <input type="checkbox"/>                                       |                                    |                                              |                                      |                                                                                                                                                                                        |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |               |              |              |  |  |                                    |                                    |                                    |                                      |                                    |                                    |                                            |                                  |                                        |                                    |                                              |                                |                                    |                                    |                                   |  |

### FAULT CATEGORY

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Landing Gear</b><br><input type="checkbox"/> Bending<br><input type="checkbox"/> Centre Not Concentric to O/S<br><input type="checkbox"/> Cracks<br><input type="checkbox"/> Crushed/Crimped<br><input type="checkbox"/> Cuffs<br><input type="checkbox"/> Heat Treat<br><input type="checkbox"/> Inspection Strip in Tube<br><input type="checkbox"/> Ripples in Bend<br><input type="checkbox"/> Torque Waves in Extrusion<br><input type="checkbox"/> Turning Sequence<br><input type="checkbox"/> Wave/Twist in Tube | <b>General</b><br><input type="checkbox"/> Bend<br><input type="checkbox"/> BOM/Route<br><input type="checkbox"/> Broken/Damaged<br><input type="checkbox"/> Burrs<br><input type="checkbox"/> Contamination<br><input type="checkbox"/> Countersink<br><input type="checkbox"/> Cut Too Short<br><input type="checkbox"/> Drill Holes<br><input type="checkbox"/> Drawing<br><input type="checkbox"/> Finish<br><input type="checkbox"/> Folio | <input type="checkbox"/> Grain<br><input type="checkbox"/> Hardware<br><input type="checkbox"/> Inspection Incomplete<br><input type="checkbox"/> Instructions Incomplete/Unclear<br><input type="checkbox"/> Maintenance<br><input type="checkbox"/> Mislabeled<br><input type="checkbox"/> Misread<br><input type="checkbox"/> Offset<br><input type="checkbox"/> Out of Calibration<br><input type="checkbox"/> Out of Sequence<br><input type="checkbox"/> Outside Dimensions |
| <input type="checkbox"/> Ovalized<br><input type="checkbox"/> Over/Under tolerance<br><input type="checkbox"/> Part Incorrect<br><input type="checkbox"/> Part Lost/Missing<br><input type="checkbox"/> Part Moved<br><input type="checkbox"/> Positioned Wrong<br><input type="checkbox"/> Power Loss/Surge                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <input type="checkbox"/> Pressure/Forced<br><input type="checkbox"/> Temperature/Cure<br><input type="checkbox"/> Weld<br><input type="checkbox"/> Wrong Stock Pulled<br><input type="checkbox"/> Other                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

# WORK ORDER NON-CONFORMANCE / UPDATE

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

NCR: Yes / No

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

|                                                                           |                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                      |                                    |                                    |                                      |                                    |                                    |                                            |                                  |                                        |                                    |                                              |                                |                                    |                                    |                                   |  |
|---------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------------------------------------|------------------------------------|--------------------------------------|------------------------------------|------------------------------------|--------------------------------------------|----------------------------------|----------------------------------------|------------------------------------|----------------------------------------------|--------------------------------|------------------------------------|------------------------------------|-----------------------------------|--|
| Work Order: <u>86985</u><br>Part No. <u>D412-664-203</u><br>NCR No. _____ | <b>DISPOSITION</b><br>Rework <input type="checkbox"/><br>Scrap <input type="checkbox"/><br>Use-as-is <input type="checkbox"/><br>Work Order Update <input type="checkbox"/> | <b>AGAINST DEPARTMENT/PROCESS</b><br><table> <tr> <td>Skid-tube <input type="checkbox"/></td> <td>Crosstube <input type="checkbox"/></td> <td>Water Jet <input type="checkbox"/></td> <td>Engineering <input type="checkbox"/></td> </tr> <tr> <td>Machining <input type="checkbox"/></td> <td>Small Fab <input type="checkbox"/></td> <td>Prod. Eng. Coord. <input type="checkbox"/></td> <td>Quality <input type="checkbox"/></td> </tr> <tr> <td>Thermoforming <input type="checkbox"/></td> <td>Finishing <input type="checkbox"/></td> <td>Rec/Store/Packaging <input type="checkbox"/></td> <td>Other <input type="checkbox"/></td> </tr> <tr> <td>Large Fab <input type="checkbox"/></td> <td>Composite <input type="checkbox"/></td> <td>Supplier <input type="checkbox"/></td> <td></td> </tr> </table> | Skid-tube <input type="checkbox"/>   | Crosstube <input type="checkbox"/> | Water Jet <input type="checkbox"/> | Engineering <input type="checkbox"/> | Machining <input type="checkbox"/> | Small Fab <input type="checkbox"/> | Prod. Eng. Coord. <input type="checkbox"/> | Quality <input type="checkbox"/> | Thermoforming <input type="checkbox"/> | Finishing <input type="checkbox"/> | Rec/Store/Packaging <input type="checkbox"/> | Other <input type="checkbox"/> | Large Fab <input type="checkbox"/> | Composite <input type="checkbox"/> | Supplier <input type="checkbox"/> |  |
| Skid-tube <input type="checkbox"/>                                        | Crosstube <input type="checkbox"/>                                                                                                                                          | Water Jet <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Engineering <input type="checkbox"/> |                                    |                                    |                                      |                                    |                                    |                                            |                                  |                                        |                                    |                                              |                                |                                    |                                    |                                   |  |
| Machining <input type="checkbox"/>                                        | Small Fab <input type="checkbox"/>                                                                                                                                          | Prod. Eng. Coord. <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Quality <input type="checkbox"/>     |                                    |                                    |                                      |                                    |                                    |                                            |                                  |                                        |                                    |                                              |                                |                                    |                                    |                                   |  |
| Thermoforming <input type="checkbox"/>                                    | Finishing <input type="checkbox"/>                                                                                                                                          | Rec/Store/Packaging <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Other <input type="checkbox"/>       |                                    |                                    |                                      |                                    |                                    |                                            |                                  |                                        |                                    |                                              |                                |                                    |                                    |                                   |  |
| Large Fab <input type="checkbox"/>                                        | Composite <input type="checkbox"/>                                                                                                                                          | Supplier <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                      |                                    |                                    |                                      |                                    |                                    |                                            |                                  |                                        |                                    |                                              |                                |                                    |                                    |                                   |  |

| Root Cause                                                                                                                                                                                                                                                                                                                                                                     | Date    | Step | Qty | Description of work order update or Non-conformance                                                                                                | Initial Chief Eng    | Action Description                                                                                                                                               | Sign & Date | Verification | QC Inspector |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|------|-----|----------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|--------------|--------------|
| Doc/Data <input type="checkbox"/><br>Equip/Tooling <input type="checkbox"/><br>Operator <input type="checkbox"/><br>Material <input type="checkbox"/><br>Setup <input type="checkbox"/><br>Other <input type="checkbox"/><br>Process <input type="checkbox"/><br>Supplier <input type="checkbox"/><br>Training <input type="checkbox"/><br>Unapproved <input type="checkbox"/> | 12/3/29 | 230  | 1   | INSTALL CHAFFING SHIELD<br>MADE TO D3185 REV. PC1<br>INSTALL PER ATTACHED<br>PRELIM COPY OF<br>D412-664-243-E-4<br>DAX SIGNED AND DATED<br>12/4/28 | DAX<br>12<br>12/4/29 | OK TO INSTALL<br>& SHIP CROSSTUBE<br>MADE TO D3185 REV.<br>PC1. CHANGE IS<br>MINOR and parts<br>have been approved to<br>D3185 REV. B with<br>accepted deviation | 12-8-30     | 12 09-05     | 12-09-05     |

## FAULT CATEGORY

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Landing Gear</b><br><input type="checkbox"/> Bending<br><input type="checkbox"/> Centre Not Concentric to O/S<br><input type="checkbox"/> Cracks<br><input type="checkbox"/> Crushed/Crimped<br><input type="checkbox"/> Cuffs<br><input type="checkbox"/> Heat Treat<br><input type="checkbox"/> Inspection Strip in Tube<br><input type="checkbox"/> Ripples in Bend<br><input type="checkbox"/> Torque Waves in Extrusion<br><input type="checkbox"/> Turning Sequence<br><input type="checkbox"/> Wave/Twist in Tube | <b>General</b><br><input type="checkbox"/> Bend<br><input type="checkbox"/> BOM/Route<br><input type="checkbox"/> Broken/Damaged<br><input type="checkbox"/> Burrs<br><input type="checkbox"/> Contamination<br><input type="checkbox"/> Countersink<br><input type="checkbox"/> Cut Too Short<br><input type="checkbox"/> Drill Holes<br><input type="checkbox"/> Drawing<br><input type="checkbox"/> Finish<br><input type="checkbox"/> Folio | <input type="checkbox"/> Grain<br><input type="checkbox"/> Hardware<br><input type="checkbox"/> Inspection Incomplete<br><input type="checkbox"/> Instructions Incomplete/Unclear<br><input type="checkbox"/> Maintenance<br><input type="checkbox"/> Mislabeled<br><input type="checkbox"/> Misread<br><input type="checkbox"/> Offset<br><input type="checkbox"/> Out of Calibration<br><input type="checkbox"/> Out of Sequence<br><input type="checkbox"/> Outside Dimensions | <input type="checkbox"/> Ovalized<br><input type="checkbox"/> Over/Under tolerance<br><input type="checkbox"/> Part Incorrect<br><input type="checkbox"/> Part Lost/Missing<br><input type="checkbox"/> Part Moved<br><input type="checkbox"/> Positioned Wrong<br><input type="checkbox"/> Power Loss/Surge | <input type="checkbox"/> Pressure/Forced<br><input type="checkbox"/> Temperature/Cure<br><input type="checkbox"/> Weld<br><input type="checkbox"/> Wrong Stock Pulled<br><input type="checkbox"/> Other |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



**Work Order ID 86985****\*86985\***

Page 7

Friday, July 06, 2012 1:03:30 PM

Item ID: D412-664-203

Accept

**\*N900040100\***Setup Start **\*NS1\***

Revision ID:

Stop **\*NS2\***

Item Name: Crosstube Aft

Start Date: 7/6/2012 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 7/18/2012 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start **\*NR1\***

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop **\*NR2\***

| Sequence ID/<br>Work Center ID                | Operation<br>Description                                  | Set Up/<br>Run Hours | Tool ID                                  | Tool # | Plan<br>Code | Accept<br>Qty | Reject<br>Qty | Reject<br>Number | Insp.<br>Stamp |
|-----------------------------------------------|-----------------------------------------------------------|----------------------|------------------------------------------|--------|--------------|---------------|---------------|------------------|----------------|
| 240<br><b>*240*</b><br>QC<br>Quality Control  | QC5- Inspect part completeness to step on W/O<br><br>Memo | 0.00<br>0.00         | -inspect assembly to<br>D412-664-243-E-4 |        |              |               |               |                  |                |
|                                               |                                                           |                      | DAS<br>16<br>12/08/27                    |        |              |               |               |                  |                |
| 250<br><b>*250*</b><br>Packaging<br>Packaging | Pick Kit<br><br>Memo                                      | 0.00<br>0.00         |                                          |        |              |               |               |                  |                |
|                                               |                                                           |                      | 12/09/05 JB                              |        |              |               |               |                  |                |
| 260<br><b>*260*</b><br>QC<br>Quality Control  | QC4- 100% Inspect kits for completeness<br><br>Memo       | 0.00<br>0.00         | DAS<br>16<br>12/08/08                    |        |              |               |               |                  |                |

| W/O: |      | WORK ORDER CHANGES |    |      |     |                                     |                          |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE   | By | Date | Qty | Approval<br>Chief Eng /<br>Prod Mgr | Approval<br>QC Inspector |
|      |      |                    |    |      |     |                                     |                          |
|      |      |                    |    |      |     |                                     |                          |

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

| NCR: |      | WORK ORDER NON-CONFORMANCE (NCR) |                             |                                 |                |                           |                       |                          |
|------|------|----------------------------------|-----------------------------|---------------------------------|----------------|---------------------------|-----------------------|--------------------------|
| DATE | STEP | Description of NC<br>Section A   | Corrective Action Section B |                                 |                | Verification<br>Section C | Approval<br>Chief Eng | Approval<br>QC Inspector |
|      |      |                                  | Initial<br>Chief Eng        | Action Description<br>Chief Eng | Sign &<br>Date |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |

**NOTE:** Date & initial all entries

**Work Order ID 86985**

Friday, July 06, 2012 1:03:30 PM

**\*86985\***

Page 8

Item ID: D412-664-203

Accept

**\*N900040100\***Setup Start **\*NS1\***

Revision ID:

Stop **\*NS2\***

Item Name: Crosstube Aft

Start Date: 7/6/2012 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 7/18/2012 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start **\*NR1\***

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop **\*NR2\***

| Sequence ID/<br>Work Center ID | Operation<br>Description | Set Up/<br>Run Hours | Tool ID | Tool # | Plan<br>Code | Accept<br>Qty | Reject<br>Qty | Reject<br>Number | Insp.<br>Stamp |
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|

270

0.00

**\*270\***

Packaging

Packaging

Memo

0.00

Identify and pack for shipping as per PPP D412-664-203

\*\*\*\*\*Ensure tube is not packaged if curing time is less than 12 hrs, see step 27

for application time &amp; date \*\*\*\*\*

Time &amp; date of packaging: \_\_\_\_\_

Location: \_\_\_\_\_

Rev I

280

0.00

**\*280\***

QC

QC21- Final Inspection - Work Order Release

Memo

0.00

Quality Control

1x \_\_\_\_\_ 50  
12-9-7.

12/9/11 DJ

2012-09-17

| W/O: |      | WORK ORDER CHANGES |    |      |     |                                     |                          |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE   | By | Date | Qty | Approval<br>Chief Eng /<br>Prod Mgr | Approval<br>QC Inspector |
|      |      |                    |    |      |     |                                     |                          |
|      |      |                    |    |      |     |                                     |                          |

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

| NCR: |      | WORK ORDER NON-CONFORMANCE (NCR) |                             |                                 |                |                           |                       |                          |
|------|------|----------------------------------|-----------------------------|---------------------------------|----------------|---------------------------|-----------------------|--------------------------|
| DATE | STEP | Description of NC<br>Section A   | Corrective Action Section B |                                 |                | Verification<br>Section C | Approval<br>Chief Eng | Approval<br>QC Inspector |
|      |      |                                  | Initial<br>Chief Eng        | Action Description<br>Chief Eng | Sign &<br>Date |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |

**NOTE:** Date & initial all entries

# Picklist Print

Friday, July 06, 2012 1:03:34 PM

Page 1

Work Order ID: 86985

**\*86985\***

Parent Item: D412-664-203

**\*D412-664-203\***

Parent Item Name: Crosstube Aft

Start Date: 7/6/2012

Required Date: 7/18/2012

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:E04.02.16Reformat; Added D3189-1K/DS  
 IPP Rev:F 06-03-29 Remove Coments on Pick List JLM  
 IPP Rev:G 06.12.08 per ECN 886 EC  
 IPP Rev:H 07-04-30 As per Rev D JLM  
 IPP Rev:I 08-06-12 add comment in seq. 21 DD verified by:EC IPP rev J  
 11.04.21 DEO D412-664-243-E-1 EC verified DD IPP REV:K  
 11.10.03 DEO D412-664-243-E-2 DD verf:EC

| Component Item ID/<br>Item Name | Replacement<br>Item ID | Mfg/<br>Purch | Bin<br>Item | Primary<br>Location | Last<br>Location | Route<br>Seq ID | Unit of<br>Measure | Qty on<br>Hand | Qty per Kit | Total<br>Qty | Qty<br>Issued | Date<br>Issued | Status |
|---------------------------------|------------------------|---------------|-------------|---------------------|------------------|-----------------|--------------------|----------------|-------------|--------------|---------------|----------------|--------|
| D412-664-203TRN                 |                        | Manufactured  | No          |                     |                  | 110             | Each               | 4.0000         | 1           | 1            |               |                |        |

**\*D412-664-203TRN\***

Crosstube Turning Detail

Location

Loc Qty

Loc Code

FG  
85387  
LG  
83832  
83835  
85390

1  
1  
3  
1  
1  
1

~~\*\* 12m 12-7-24~~  
 3AN 12-07-24



D2896-1

Manufactured No

230

Each

19.0000

1

1

**\*D2896-1\***

Support

\*\*

AL 12-8-25

Location

Loc Qty

Loc Code

LG052  
80586  
LG053  
74465

8  
8  
11  
11

①

| W/O: |      | WORK ORDER CHANGES |    |      |     |                                     |                          |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE   | By | Date | Qty | Approval<br>Chief Eng /<br>Prod Mgr | Approval<br>QC Inspector |
|      |      |                    |    |      |     |                                     |                          |
|      |      |                    |    |      |     |                                     |                          |

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

| NCR: |      | WORK ORDER NON-CONFORMANCE (NCR) |                             |                                 |                |                           |                       |                          |
|------|------|----------------------------------|-----------------------------|---------------------------------|----------------|---------------------------|-----------------------|--------------------------|
| DATE | STEP | Description of NC<br>Section A   | Corrective Action Section B |                                 |                | Verification<br>Section C | Approval<br>Chief Eng | Approval<br>QC Inspector |
|      |      |                                  | Initial<br>Chief Eng        | Action Description<br>Chief Eng | Sign &<br>Date |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |

**NOTE:** Date & initial all entries

# Picklist Print

Page 2

Friday, July 06, 2012 1:03:34 PM

Work Order ID: 86985

**\*86985\***

Parent Item: D412-664-203

**\*D412-664-203\***

Parent Item Name: Crosstube Aft

Start Date: 7/6/2012

Required Date: 7/18/2012

Start Qty: 1.00

Required Qty: 1.00

D3189-1

Manufactured No

230

Each

22.0000

2

2

\*\*

**\*D3189-1\***

Chafing Shield

Location

Loc Qty

Loc Code

FG

89028

89609

4

36065

4

LG053

18

83458

12

83972

6

② → NCR

③ → AB 12-8-30

AB 12-8-25

D3595-063-570

Manufactured No

230

Each

147.0000

2

2

\*\*

**\*D3595-063-570\***

RUBBER CUSHION

Location

Loc Qty

Loc Code

FG

8

37971

1

42243

7

LG

78

83294

78

MAT052

61

71534

1

76546

60

②

AB 12-8-25

Friday, July 06, 2012 1:03:34 PM

Shop Packet Print

Page 2

| W/O: |      | WORK ORDER CHANGES |    |      |     |                                     |                          |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE   | By | Date | Qty | Approval<br>Chief Eng /<br>Prod Mgr | Approval<br>QC Inspector |
|      |      |                    |    |      |     |                                     |                          |
|      |      |                    |    |      |     |                                     |                          |

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

| NCR: |      | WORK ORDER NON-CONFORMANCE (NCR) |                             |                                 |                |                           |                       |                          |
|------|------|----------------------------------|-----------------------------|---------------------------------|----------------|---------------------------|-----------------------|--------------------------|
| DATE | STEP | Description of NC<br>Section A   | Corrective Action Section B |                                 |                | Verification<br>Section C | Approval<br>Chief Eng | Approval<br>QC Inspector |
|      |      |                                  | Initial<br>Chief Eng        | Action Description<br>Chief Eng | Sign &<br>Date |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |

**NOTE:** Date & initial all entries



# Picklist Print

Page 3

Friday, July 06, 2012 1:03:34 PM

Work Order ID: 86985

**\*86985\***

Parent Item: D412-664-203

**\*D412-664-203\***

Parent Item Name: Crosstube Aft

Start Date: 7/6/2012

Required Date: 7/18/2012

Start Qty: 1.00

Required Qty: 1.00

MS21920-28

Purchased

No

230

Each

92.0000

4

4

**\*MS21920-28\***

Clamp(per MIL-DTL-8783C)

\*\*

12-8-25

LocationLoc QtyLoc Code

FG

5

105884

5

LG050

29

116839

2

118713

4

120054

2

121067

21

LG051

58

121440

8

122204

50

MS21920-30

Purchased

No

230

Each

95.0000

2

2

**\*MS21920-30\***

clamp(per MIL-DTL-8783C)

\*\*

12-8-25

LocationLoc QtyLoc Code

LG

32

119529

32

LG051

63

111258

14

121583

49

AN6-40A

Purchased

No

250

Each

128.0000

4

4

**\*AN6-40A\***

Bolt

\*\*

12/09/05

LocationLoc QtyLoc Code

ST342

128

120187

66

120833

4

121584

8

121827

50

Friday, July 06, 2012 1:03:34 PM

Shop Packet Print

Page 3

| W/O: |      | WORK ORDER CHANGES |    |      |     |                                     |                          |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE   | By | Date | Qty | Approval<br>Chief Eng /<br>Prod Mgr | Approval<br>QC Inspector |
|      |      |                    |    |      |     |                                     |                          |
|      |      |                    |    |      |     |                                     |                          |

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

| NCR: |      | WORK ORDER NON-CONFORMANCE (NCR) |                             |                                 |                |                           |                       |                          |
|------|------|----------------------------------|-----------------------------|---------------------------------|----------------|---------------------------|-----------------------|--------------------------|
| DATE | STEP | Description of NC<br>Section A   | Corrective Action Section B |                                 |                | Verification<br>Section C | Approval<br>Chief Eng | Approval<br>QC Inspector |
|      |      |                                  | Initial<br>Chief Eng        | Action Description<br>Chief Eng | Sign &<br>Date |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |

**NOTE:** Date & initial all entries

# Picklist Print

Page 4

Friday, July 06, 2012 1:03:34 PM

Work Order ID: 86985

\*86985\*

Parent Item: D412-664-203

\*D412-664-203\*

Parent Item Name: Crosstube Aft

Start Date: 7/6/2012

Required Date: 7/18/2012

Start Qty: 1.00

Required Qty: 1.00

AN6-41A Purchased No

250 Each

67.0000

\*\*  2 ✓

2

JB

2

\*AN6-41A\*  
Bolt

Location

Loc Qty

Loc Code

ST342

67

120423

37

121825

30

120423

AN960JD616 NAS1149D0663J Purchased No

250 Each

0.0000

\*\*  18 ✓

18

122452

JB

12/0905

\*AN960JD616\*

Washer

MS210421-6 Purchased No

250 Each

497.0000

\*\*  6

6

MISSY

6

\*MS210421-6\*

Nut

Location

Loc Qty

Loc Code

ST300

497

117677

25

118384

3

118927

48

119075

221

120308

200

# Dart Aerospace Ltd

| W/O: |      | WORK ORDER CHANGES |    |      |     |                                     |                          |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE   | By | Date | Qty | Approval<br>Chief Eng /<br>Prod Mgr | Approval<br>QC Inspector |
|      |      |                    |    |      |     |                                     |                          |
|      |      |                    |    |      |     |                                     |                          |

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

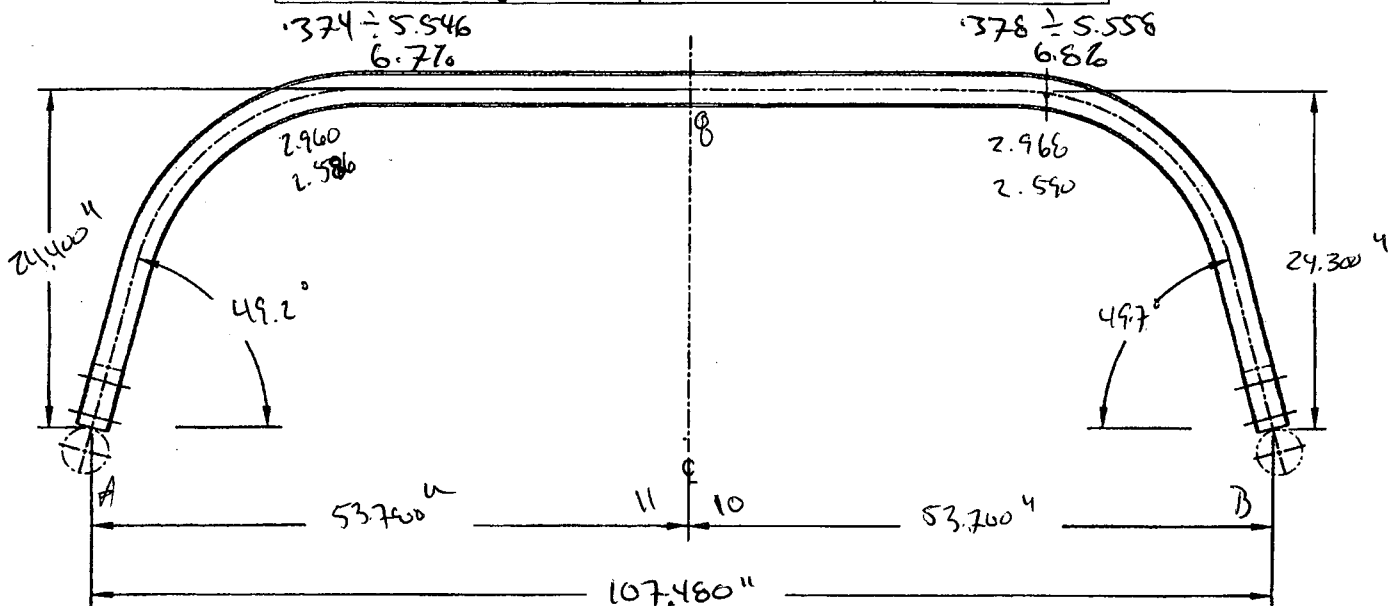
Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

| NCR: |      | WORK ORDER NON-CONFORMANCE (NCR) |                             |                                 |                |                           |                       |                          |
|------|------|----------------------------------|-----------------------------|---------------------------------|----------------|---------------------------|-----------------------|--------------------------|
| DATE | STEP | Description of NC<br>Section A   | Corrective Action Section B |                                 |                | Verification<br>Section C | Approval<br>Chief Eng | Approval<br>QC Inspector |
|      |      |                                  | Initial<br>Chief Eng        | Action Description<br>Chief Eng | Sign &<br>Date |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |

**NOTE:** Date & initial all entries

|                                                   |  |                     |              |
|---------------------------------------------------|--|---------------------|--------------|
| <b>DART AEROSPACE LTD</b>                         |  | <b>Work Order:</b>  | 86285        |
| <b>Description:</b> Crosstube High Aft (412)      |  | <b>Part Number:</b> | D412-664-203 |
| <b>Inspection Dwg:</b> D412-664-243 <b>Rev:</b> E |  | <b>Page 1 of 1</b>  |              |

| Required Dimension | Min    | Max    |
|--------------------|--------|--------|
| Height             | 24.24  | 24.50  |
| 1/2 Span           | 53.59  | 53.85  |
| Angle              | 49     | 52     |
| Total Span         | 107.18 | 107.70 |
| Bending Passes     | 8      | --     |
| Crushing           | --     | 6%     |



|                    | Side A | Middle | Side B |
|--------------------|--------|--------|--------|
| Bending Passes     | 11     | 8      | 10     |
| Crushing           | 6.77%  |        | 6.82%  |
| Comments           |        |        |        |
| Side A = 11 Passes |        |        |        |
| Middle = 8 Passes  |        |        |        |
| Side B = 10 Passes |        |        |        |

|                 |          |
|-----------------|----------|
| QC15 Inspection | DAS      |
| Date            | 16/07/16 |

| Rev | Date     | Change                             | Revised by | Approved |
|-----|----------|------------------------------------|------------|----------|
| A   | 07.02.06 | New Issue                          | KJ/JM      |          |
| B   | 07.05.08 | Dimensions updated per Dwg rev. D  | KJ/JLM     |          |
| C   | 10.02.02 | Dwg Rev updated                    | KJ         |          |
| D   | 12.04.16 | Added bending, crushing dimensions | KJ         | IP       |

**Dart Aerospace Ltd**

| W/O: |      | WORK ORDER CHANGES |    |      |     |                                     |                          |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE   | By | Date | Qty | Approval<br>Chief Eng /<br>Prod Mgr | Approval<br>QC Inspector |
|      |      |                    |    |      |     |                                     |                          |
|      |      |                    |    |      |     |                                     |                          |

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

| NCR: |      | WORK ORDER NON-CONFORMANCE (NCR) |                             |                                 |                |                           |                       |                          |
|------|------|----------------------------------|-----------------------------|---------------------------------|----------------|---------------------------|-----------------------|--------------------------|
| DATE | STEP | Description of NC<br>Section A   | Corrective Action Section B |                                 |                | Verification<br>Section C | Approval<br>Chief Eng | Approval<br>QC Inspector |
|      |      |                                  | Initial<br>Chief Eng        | Action Description<br>Chief Eng | Sign &<br>Date |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |

**NOTE:** Date & initial all entries

| Item | Qty<br>-243 | Part Number    | Description                                                                                                   |
|------|-------------|----------------|---------------------------------------------------------------------------------------------------------------|
| 1    | X           | D412-664-243   | CROSSTUBE ASSEMBLY (412 HIGH AFT)                                                                             |
| 2    | 1           | D6009-129      | CROSSTUBE                                                                                                     |
| 3    | 2           | D3595-063-570  | RUBBER CUSHION                                                                                                |
| 4    | 1           | D2896-1        | SUPPORT                                                                                                       |
| 5    | 2           | D3189-1        | CHAFING SHIELD                                                                                                |
| 6    | 2           | D2856-600-1009 | ABRASION STRIP                                                                                                |
| 7    | 4           | MS21920-28     | CLAMP                                                                                                         |
| 8    | 2           | MS21920-30     | CLAMP (OR MS21920-32)                                                                                         |
| 9    | A/R         | MAGNOBOND 6398 | ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE<br>(TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2<br>ADHESIVE) |

# **GENERAL NOTES:**

- MATERIAL: MANUFACTURED FROM D6009-129  
FINISHED LENGTH = 124.100±0.020 (BEFORE BENDING/TRIMMING)
- FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2
- TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- UNITS: INCHES UNLESS OTHERWISE NOTED.
- BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- IDENTIFICATION: SCRIBE DART PART NUMBER "D412-664-243" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
- WEIGHT: 47.0 lbs (PER IIN-D212-664)
- PART IS SYMMETRIC ABOUT CENTERLINE.
- RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- INSTALL D2896-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2896-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- INSTALL MS21920-30 CLAMPS (OR -32) WITH D3595-063-570 RUBBER CUSHIONS TO SECURE THE D2896-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT.
- INSTALL D2856-600-1009 ABRASION STRIPS WITH A 0.13 REF GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.
- EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP COPY  
RETURN TO  
ENGINEERING  
UNCONTROLLED COPY  
SUBJECT TO AMENDMENT

WITHOUT NOTICE  
WORK ORDER

NO. 86985

PL12-074

② DEO ATTACHED

RELEASED  
2009-10-29

|            |                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                |              |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| E          | REFORMAT/REVISE GENERAL NOTES;<br>REORGANIZED VIEWS AND REFORMATTED DRAWING<br>TO CURRENT STANDARDS; RELOCATED FLAG #6 PER<br>PAR 08-046 (ZN A6-3); ADD TOLERANCE (ZN B6-3, C4-3,<br>C8-3 & C5-3); MOVED TURNING DETAIL & UPDATED<br>TOLERANCE TO SHEET 4. | RF                                                                                                                                                                                                                                                                             | 09.09.30     |
| D          | REMOVE D2732-058, CHANGE TO D3595-063-570                                                                                                                                                                                                                  | PH                                                                                                                                                                                                                                                                             | 07.03.09     |
| C          | REMOVE D2856-600-1087, ADD D2732-058 &<br>MAGNOBOND 6398, MS21920-32 WAS MS21920-30                                                                                                                                                                        | MB                                                                                                                                                                                                                                                                             | 06.10.27     |
| B          | ADD HOLES FOR COMPATABILITY WITH BHT/AA<br>SKIDTUBES                                                                                                                                                                                                       | PH                                                                                                                                                                                                                                                                             | 05.02.04     |
| A          | NEW ISSUE                                                                                                                                                                                                                                                  | PH                                                                                                                                                                                                                                                                             | 01.10.17     |
| REV.       | DESCRIPTION                                                                                                                                                                                                                                                | BY                                                                                                                                                                                                                                                                             | DATE         |
| DESIGN     | PH                                                                                                                                                                                                                                                         | DART AEROSPACE LTD<br>HAWKESBURY, ONTARIO, CANADA                                                                                                                                                                                                                              |              |
| DRAWN      | RF                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                |              |
| CHECKED    | PH                                                                                                                                                                                                                                                         | DRAWING NO.                                                                                                                                                                                                                                                                    | REV. E       |
| MFG. APPR. | PH                                                                                                                                                                                                                                                         | D412-664-243                                                                                                                                                                                                                                                                   | SHEET 1 OF 4 |
| APPROVED   | PH                                                                                                                                                                                                                                                         | TITLE                                                                                                                                                                                                                                                                          | SCALE        |
| DE APPR.   | PH                                                                                                                                                                                                                                                         | CROSSTUBE ASSEMBLY (412 HI AFT)                                                                                                                                                                                                                                                | NTS          |
| DATE       | 09.09.30                                                                                                                                                                                                                                                   | COPYRIGHT © 2001 BY DART AEROSPACE LTD<br>THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS<br>NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT<br>WRITTEN PERMISSION FROM DART AEROSPACE LTD. |              |

| W/O: |      | WORK ORDER CHANGES |    |      |     |                                     |                          |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE   | By | Date | Qty | Approval<br>Chief Eng /<br>Prod Mgr | Approval<br>QC Inspector |
|      |      |                    |    |      |     |                                     |                          |
|      |      |                    |    |      |     |                                     |                          |

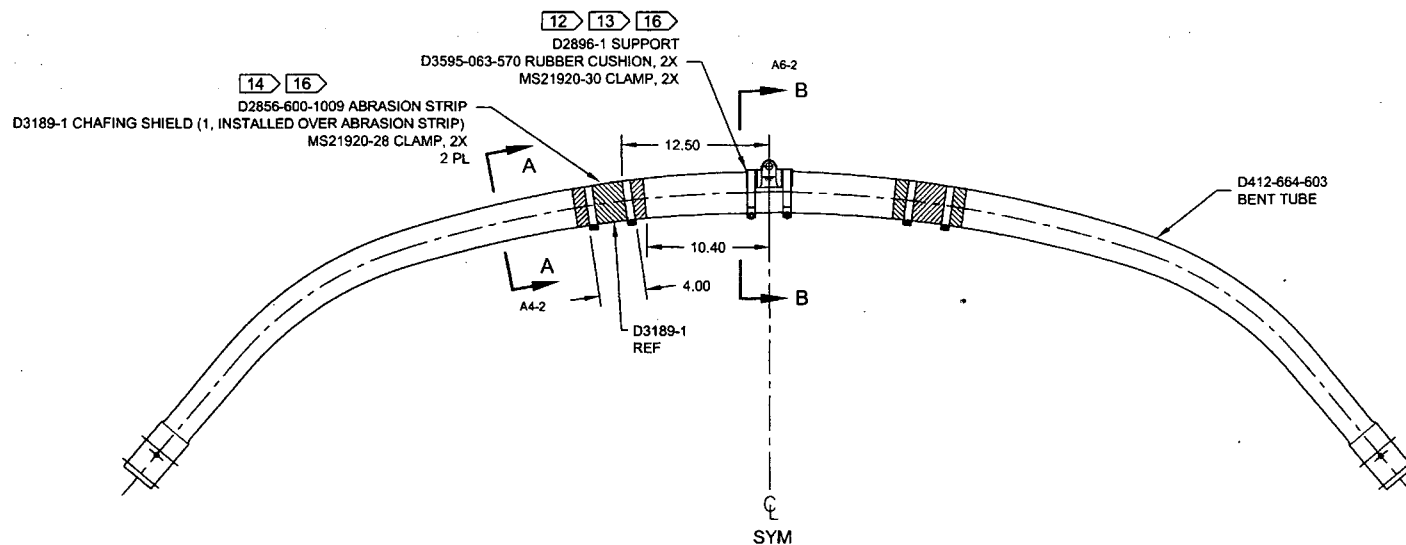
Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

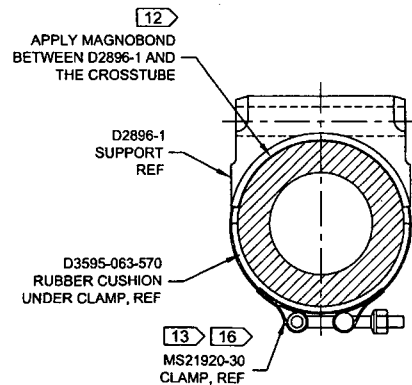
| NCR: |      | WORK ORDER NON-CONFORMANCE (NCR) |                             |                                 |                |                           |                       |                          |
|------|------|----------------------------------|-----------------------------|---------------------------------|----------------|---------------------------|-----------------------|--------------------------|
| DATE | STEP | Description of NC<br>Section A   | Corrective Action Section B |                                 |                | Verification<br>Section C | Approval<br>Chief Eng | Approval<br>QC Inspector |
|      |      |                                  | Initial<br>Chief Eng        | Action Description<br>Chief Eng | Sign &<br>Date |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |

**NOTE:** Date & initial all entries

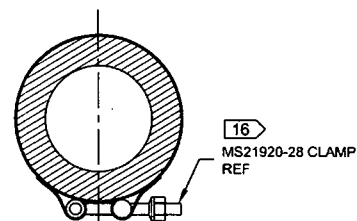




**D212-664-243**  
**ASSEMBLY DETAIL** E



**SECTION B-B** D4-2  
SCALE 4X



**SECTION A-A** C6-2  
SCALE 4X

86985

2 DEO ATTACHED

**RELEASED**  
2009-10-28  
MJP

|            |          |                                                                                                                                                                                                                                                                                              |              |
|------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| DESIGN     | PH       | <b>DART AEROSPACE LTD</b>                                                                                                                                                                                                                                                                    |              |
| DRAWN      | RF       | HAWKESBURY, ONTARIO, CANADA                                                                                                                                                                                                                                                                  |              |
| CHECKED    | 92       | DRAWING NO.                                                                                                                                                                                                                                                                                  | REV. E       |
| MFG. APPR. | 13       | D412-664-243                                                                                                                                                                                                                                                                                 | SHEET 2 OF 4 |
| APPROVED   | 10       | TITLE                                                                                                                                                                                                                                                                                        | SCALE        |
| DE APPR.   | 11       | CROSSTUBE ASSEMBLY (412 HI AFT)                                                                                                                                                                                                                                                              | NTS          |
| DATE       | 09.09.30 | <small>COPYRIGHT © 2001 BY DART AEROSPACE LTD<br/>THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COMMERCE OR COMMUNICATIONS TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.</small> |              |

| W/O: |      | WORK ORDER CHANGES |    |      |     |                                     |                          |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE   | By | Date | Qty | Approval<br>Chief Eng /<br>Prod Mgr | Approval<br>QC Inspector |
|      |      |                    |    |      |     |                                     |                          |
|      |      |                    |    |      |     |                                     |                          |

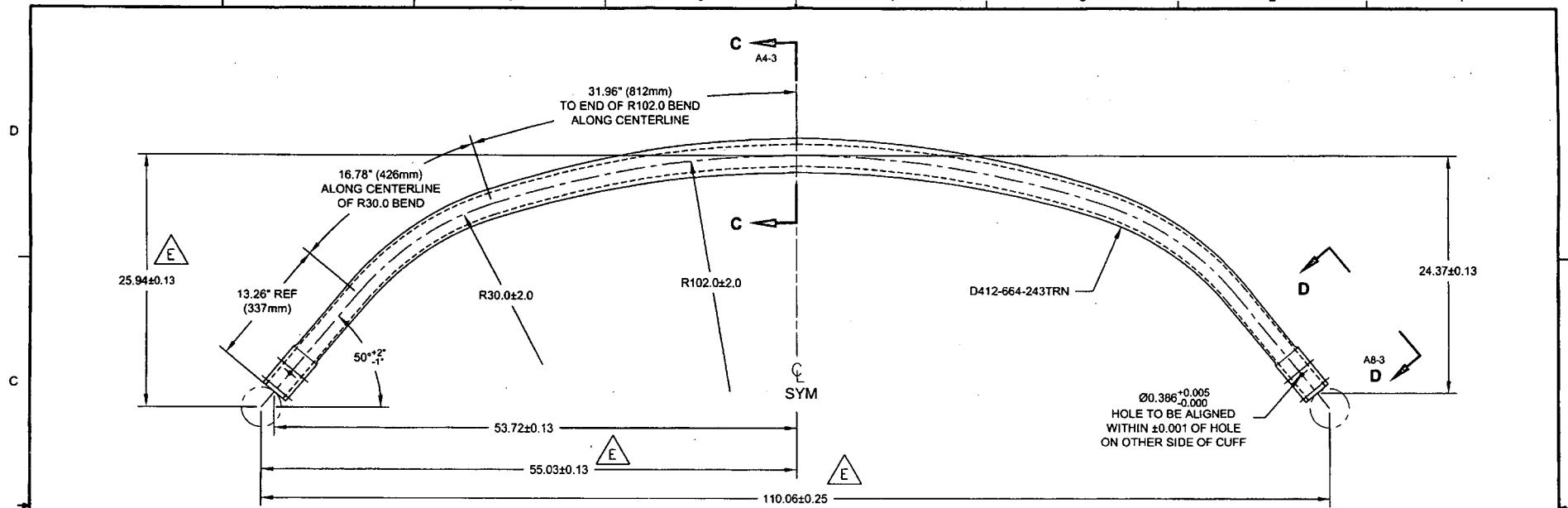
Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

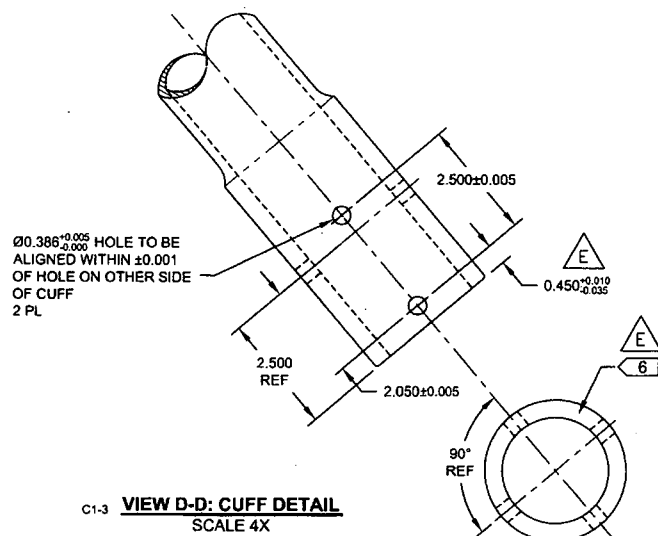
| NCR: |      | WORK ORDER NON-CONFORMANCE (NCR) |                             |                                 |                |                           |                       |                          |
|------|------|----------------------------------|-----------------------------|---------------------------------|----------------|---------------------------|-----------------------|--------------------------|
| DATE | STEP | Description of NC<br>Section A   | Corrective Action Section B |                                 |                | Verification<br>Section C | Approval<br>Chief Eng | Approval<br>QC Inspector |
|      |      |                                  | Initial<br>Chief Eng        | Action Description<br>Chief Eng | Sign &<br>Date |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |

**NOTE:** Date & initial all entries

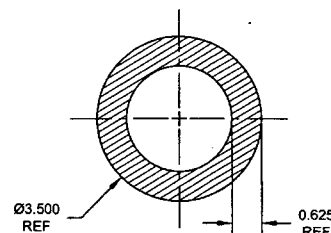
8 7 6 5 4 3 2 1



**D412-664-603** 10  
**BENDING AND DRILLING DETAIL**



C1-3 **VIEW D-D: CUFF DETAIL**  
 SCALE 4X



**SECTION C-C** D5-3  
 SCALE 4X

8698 S

② DEO ATTACHED

**RELEASED**  
 2009-10-29  
 MP

|                                                                                                                                                                                                                                |          |                                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------------------------------------|
| DESIGN                                                                                                                                                                                                                         | PH       | <b>DART AEROSPACE LTD</b>              |
| DRAWN                                                                                                                                                                                                                          | RF       | HAWKESBURY, ONTARIO, CANADA            |
| CHECKED                                                                                                                                                                                                                        | 92       | DRAWING NO. REV. E                     |
| MFG. APPR.                                                                                                                                                                                                                     | 10       | D412-664-243 SHEET 3 OF 4              |
| APPROVED                                                                                                                                                                                                                       | 10       | TITLE SCALE                            |
| DE APPR.                                                                                                                                                                                                                       | 10       | CROSSTUBE ASSEMBLY (412 HI AFT) NTS    |
| DATE                                                                                                                                                                                                                           | 09.09.30 | COPYRIGHT © 2001 BY DART AEROSPACE LTD |
| THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD. |          |                                        |

8 7 6 5 4 3 2 1

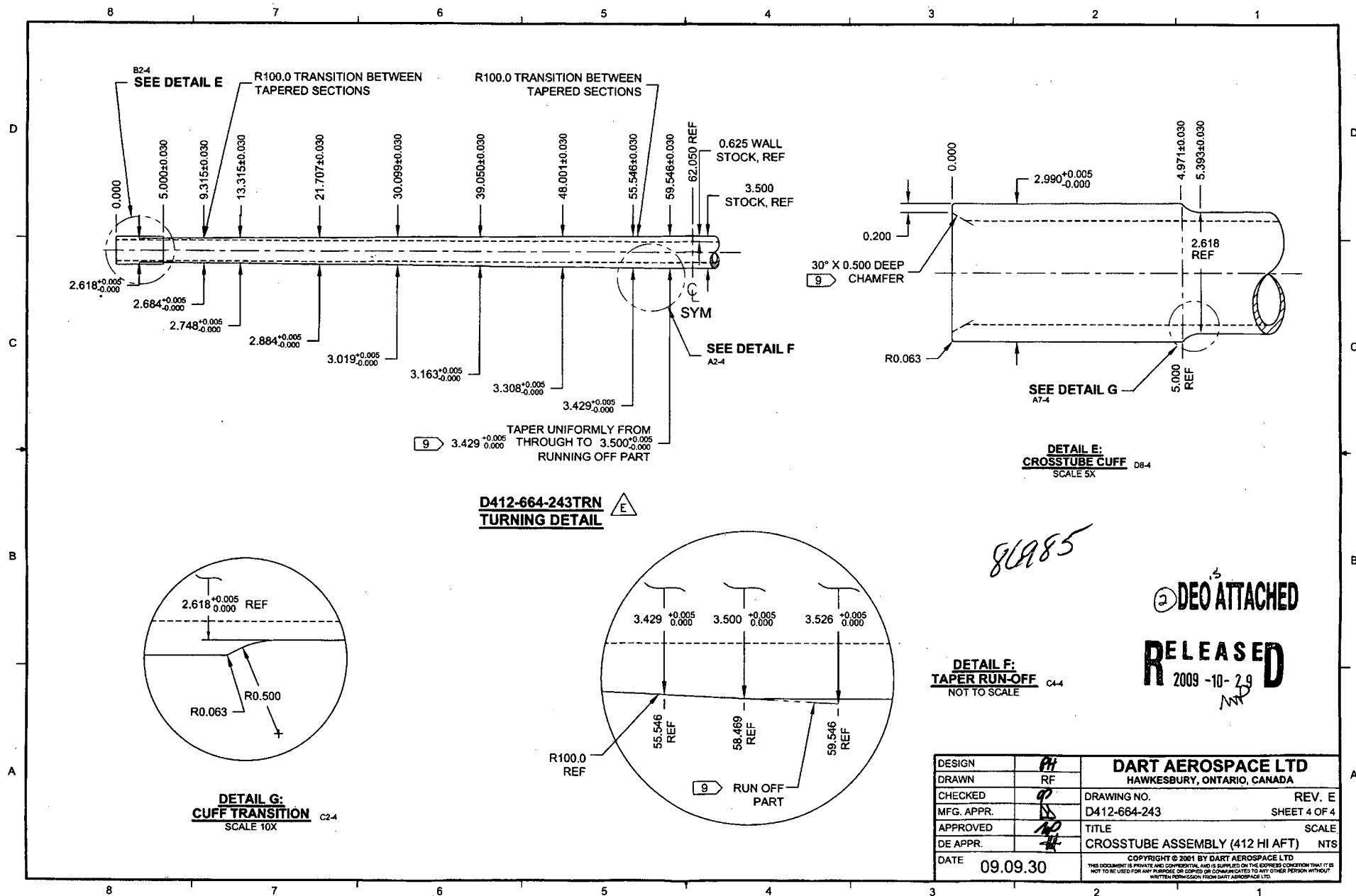
| W/O: |      | WORK ORDER CHANGES |    |      |     |                                     |                          |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE   | By | Date | Qty | Approval<br>Chief Eng /<br>Prod Mgr | Approval<br>QC Inspector |
|      |      |                    |    |      |     |                                     |                          |
|      |      |                    |    |      |     |                                     |                          |

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

| NCR: |      | WORK ORDER NON-CONFORMANCE (NCR) |                             |                                 |                |                           |                       |                          |
|------|------|----------------------------------|-----------------------------|---------------------------------|----------------|---------------------------|-----------------------|--------------------------|
| DATE | STEP | Description of NC<br>Section A   | Corrective Action Section B |                                 |                | Verification<br>Section C | Approval<br>Chief Eng | Approval<br>QC Inspector |
|      |      |                                  | Initial<br>Chief Eng        | Action Description<br>Chief Eng | Sign &<br>Date |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |

**NOTE:** Date & initial all entries



| W/O: |      | WORK ORDER CHANGES |    |      |     |                                     |                          |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE   | By | Date | Qty | Approval<br>Chief Eng /<br>Prod Mgr | Approval<br>QC Inspector |
|      |      |                    |    |      |     |                                     |                          |
|      |      |                    |    |      |     |                                     |                          |

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

| NCR: |      | WORK ORDER NON-CONFORMANCE (NCR) |                             |                                 |                |                           |                       |                          |
|------|------|----------------------------------|-----------------------------|---------------------------------|----------------|---------------------------|-----------------------|--------------------------|
| DATE | STEP | Description of NC<br>Section A   | Corrective Action Section B |                                 |                | Verification<br>Section C | Approval<br>Chief Eng | Approval<br>QC Inspector |
|      |      |                                  | Initial<br>Chief Eng        | Action Description<br>Chief Eng | Sign &<br>Date |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |

**NOTE:** Date & initial all entries

|                             |                                          |                     |                                         |                    |                                |                           |              |
|-----------------------------|------------------------------------------|---------------------|-----------------------------------------|--------------------|--------------------------------|---------------------------|--------------|
| DRAWING NO.<br>D412-664-243 | TITLE<br>CROSSTUBE ASSEMBLY (412 HI AFT) | REV. E              | DART AEROSPACE LTD<br>ENGINEERING ORDER |                    | D.E.O. NO.<br>D412-664-243-E-1 | SHEET NO.<br>SHEET 1 OF 2 | SCALE<br>NTS |
| DRAWN                       | CHECKED <i>MP</i>                        | MFG. APPR. <i>E</i> | APPROVED <i>MP</i>                      | DE APPR. <i>MP</i> |                                |                           |              |
| DATE 11.03.31               | DATE 11/03.31                            | DATE 11.03.31       | DATE 11/03.31                           | DATE 11.03.31      |                                |                           |              |

**PURPOSE:**

REMOVED ABRASION STRIP IN FAVOR OF A THIN LAYER OF PROSEAL 890.

**CHANGE:**

PARTS LIST IS AMENDED AS FOLLOWS:

**IS:**

| Item | Qty<br>-243 | Part Number    | Description    |
|------|-------------|----------------|----------------|
| 6    | 0           | D2856-600-1009 | ABRASION STRIP |

**WAS:**

|   |   |                |                |
|---|---|----------------|----------------|
| 6 | 2 | D2856-600-1009 | ABRASION STRIP |
|---|---|----------------|----------------|

NOTES 2 AND 14, SHEET 1 ARE AMENDED AS FOLLOWS:

**IS:**

- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
MASK UNDERSIDE OF CROSSTUBE AS SHOWN (HATCHED AREA)  
PAINT OUTSIDE PER DART QSI 005 4.2  
AFTER PAINTING, APPLY CLEAR COAT ON HATCHED AREA
- 14) APPLY A THIN COAT OF PROSEAL 890 ON INSIDE CONCAVE SURFACE OF D3189-1  
CHAFING SHIELD AND LET CURE PER MANUFACTURER'S INSTRUCTIONS. INSTALL  
PROSEALED D3189-1 CHAFING SHIELD ONTO CROSSTUBE BY APPLYING A THIN COAT OF  
PROSEAL 890 ONTO CROSSTUBE. BE SURE TO ELIMINATE ANY AIR GAPS.

**WAS:**

- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2
- 14) INSTALL D2856-600-1009 ABRASION STRIPS WITH A 0.13 REF GAP ON BOTTOM SIDE OF  
CROSSTUBE PER QSI 035.

86985  
RELEASED  
2011-04-07  
*MP*

| W/O: |      | WORK ORDER CHANGES |    |      |     |                                     |                          |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE   | By | Date | Qty | Approval<br>Chief Eng /<br>Prod Mgr | Approval<br>QC Inspector |
|      |      |                    |    |      |     |                                     |                          |
|      |      |                    |    |      |     |                                     |                          |

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

| NCR: |      | WORK ORDER NON-CONFORMANCE (NCR) |                             |                                 |                |                           |                       |                          |
|------|------|----------------------------------|-----------------------------|---------------------------------|----------------|---------------------------|-----------------------|--------------------------|
| DATE | STEP | Description of NC<br>Section A   | Corrective Action Section B |                                 |                | Verification<br>Section C | Approval<br>Chief Eng | Approval<br>QC Inspector |
|      |      |                                  | Initial<br>Chief Eng        | Action Description<br>Chief Eng | Sign &<br>Date |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |

**NOTE:** Date & initial all entries



|                             |                                          |                               |                                         |                                |                           |              |
|-----------------------------|------------------------------------------|-------------------------------|-----------------------------------------|--------------------------------|---------------------------|--------------|
| DRAWING NO.<br>D412-664-243 | TITLE<br>CROSSTUBE ASSEMBLY (412 HI AFT) | REV. E                        | DART AEROSPACE LTD<br>ENGINEERING ORDER | D.E.O. NO.<br>D412-664-243-E-1 | SHEET NO.<br>SHEET 2 OF 2 | SCALE<br>NTS |
| DRAWN <i>[Signature]</i>    | CHECKED <i>[Signature]</i>               | MFG. APPR. <i>[Signature]</i> | APPROVED <i>[Signature]</i>             | DE APPR. <i>[Signature]</i>    |                           |              |
| DATE 11.03.31               | DATE 11.03.31                            | DATE 11.03.31                 | DATE 11.03.31                           | DATE 11.03.31                  |                           |              |

**IS:**

D3189-1 CHAFING SHIELD (1, INSTALLED OVER PROSEAL 890)  
MS21920-28 CLAMP, 2X  
2 PL

D412-664-603  
BENT TUBE

2.00  
1.00

**WAS:**

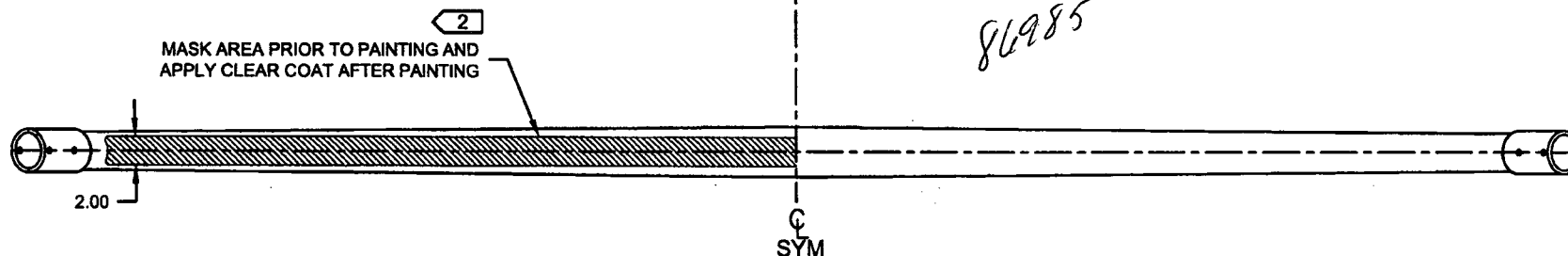
D2856-600-1009 ABRASION STRIP  
D3189-1 CHAFING SHIELD (1, INSTALLED OVER ABRASION STRIP)  
MS21920-28 CLAMP, 2X  
2 PL

D3189-1  
REF

**D412-664-243  
ASSEMBLY DETAIL**

**RELEASED**  
2011-04-07  
*[Signature]*

86985



| W/O: |      | WORK ORDER CHANGES |    |      |     |                                     |                          |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE   | By | Date | Qty | Approval<br>Chief Eng /<br>Prod Mgr | Approval<br>QC Inspector |
|      |      |                    |    |      |     |                                     |                          |
|      |      |                    |    |      |     |                                     |                          |

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

| NCR: |      | WORK ORDER NON-CONFORMANCE (NCR) |                             |                                 |                |                           |                       |                          |
|------|------|----------------------------------|-----------------------------|---------------------------------|----------------|---------------------------|-----------------------|--------------------------|
| DATE | STEP | Description of NC<br>Section A   | Corrective Action Section B |                                 |                | Verification<br>Section C | Approval<br>Chief Eng | Approval<br>QC Inspector |
|      |      |                                  | Initial<br>Chief Eng        | Action Description<br>Chief Eng | Sign &<br>Date |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |

**NOTE:** Date & initial all entries

|                             |                                       |                     |                                         |  |                                |                           |              |
|-----------------------------|---------------------------------------|---------------------|-----------------------------------------|--|--------------------------------|---------------------------|--------------|
| DRAWING NO.<br>D412-664-243 | TITLE<br>CROSSTUBE ASS'Y (412 HI AFT) | REV. E              | DART AEROSPACE LTD<br>ENGINEERING ORDER |  | D.E.O. NO.<br>D412-664-243-E-2 | SHEET NO.<br>SHEET 1 OF 1 | SCALE<br>NTS |
| DRAWN <i>q</i>              | CHECKED <i>AS</i>                     | MFG. APPR. <i>E</i> | APPROVED <i>MP</i>                      |  | DE APPR. <i>#</i>              |                           |              |
| DATE 11.09.07               | DATE 11.09.19                         | DATE 11.09.19       | DATE 11.09.19                           |  | DATE 11.09.19                  |                           |              |

**PURPOSE:**

REPLACE MAGNOBOND WITH 3M DP460 SCOTCH-WELD EPOXY ADHESIVE

**CHANGE:**

IS:

| Item | Qty<br>-243 | Part Number       | Description                    |
|------|-------------|-------------------|--------------------------------|
| 9    | A/R         | SCOTCH-WELD DP460 | EPOXY ADHESIVE, 3M SCOTCH-WELD |

WAS:

|   |     |                |                                                                                                               |
|---|-----|----------------|---------------------------------------------------------------------------------------------------------------|
| 9 | A/R | MAGNOBOND 6398 | ROCKWELL SPECIFICATION RBO-120-023<br>ADHESIVE (TEXTRON/BELL SPEC. 299-947-100,<br>TYPE II, CLASS 2 ADHESIVE) |
|---|-----|----------------|---------------------------------------------------------------------------------------------------------------|

NOTE 12 & 16, SHEET 1 IS AMENDED AS FOLLOWS:

IS:

- 12) INSTALL D2896-1 CENTER SUPPORT USING A 0.04" TO 0.07" THICK LAYER OF SCOTCH-WELD DP460 PER QSI 015. LET CURE FOR 24 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 16) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. **PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER ADHESIVE HAS CURED FOR 24 HOURS.**

WAS:

- 12) INSTALL D2896-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2896-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 16) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

*8685*

**RELEASED**  
2011-09-29  
*MP*

| W/O: |      | WORK ORDER CHANGES |    |      |     |                                     |                          |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE   | By | Date | Qty | Approval<br>Chief Eng /<br>Prod Mgr | Approval<br>QC Inspector |
|      |      |                    |    |      |     |                                     |                          |
|      |      |                    |    |      |     |                                     |                          |

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

| NCR: |      | WORK ORDER NON-CONFORMANCE (NCR) |                             |                                 |                |                           |                       |                          |
|------|------|----------------------------------|-----------------------------|---------------------------------|----------------|---------------------------|-----------------------|--------------------------|
| DATE | STEP | Description of NC<br>Section A   | Corrective Action Section B |                                 |                | Verification<br>Section C | Approval<br>Chief Eng | Approval<br>QC Inspector |
|      |      |                                  | Initial<br>Chief Eng        | Action Description<br>Chief Eng | Sign &<br>Date |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |

**NOTE:** Date & initial all entries

|                  |                                 |                                         |                                |                           |              |
|------------------|---------------------------------|-----------------------------------------|--------------------------------|---------------------------|--------------|
| D412-664-243     | CROSSTUBE ASSEMBLY (412 HI AFT) | DART AEROSPACE LTD<br>ENGINEERING ORDER | D.E.O. NO.<br>D412-664-243-E-4 | SHEET NO.<br>SHEET 1 OF 3 | SCALE<br>NTS |
| DRAWN<br>92      | CHECKED                         | MFG. APPR.                              | APPROVED                       | DE APPR.                  |              |
| DATE<br>12.08.21 | DATE<br>12.08.27                | DATE                                    | DATE                           | DATE                      |              |

**PURPOSE:**

REMOVED ABRASION STRIP IN FAVOR OF A THIN LAYER OF PROSEAL 890. THIS ENGINEERING ORDER SUPERCEDES DEO D412-664-243-E-1

**CHANGE:**

PARTS LIST IS AMENDED AS FOLLOWS:

**IS:**

| Item | Qty<br>-243 | Part Number    | Description    |
|------|-------------|----------------|----------------|
| 6    | 0           | D2856-600-1009 | ABRASION STRIP |

**WAS:**

|   |   |                |                |
|---|---|----------------|----------------|
| 6 | 2 | D2856-600-1009 | ABRASION STRIP |
|---|---|----------------|----------------|

NOTES 2, 14, AND 16 ON SHEET 1 ARE AMENDED AS FOLLOWS:

**IS:**

- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
MASK UNDERSIDE OF CROSSTUBE AS SHOWN (HATCHED AREA)  
PAINT OUTSIDE PER DART QSI 005 4.2  
AFTER PAINTING, APPLY CLEAR COAT ON HATCHED AREA
- 14) APPLY A THIN COAT OF PROSEAL 890 ON INSIDE CONCAVE SURFACE OF D3189-1 CHAFING SHIELD AND LET CURE PER MANUFACTURER'S INSTRUCTIONS. INSTALL PROSEALED D3189-1 CHAFING SHIELD ONTO CROSSTUBE BY APPLYING A THIN COAT OF PROSEAL 890 ONTO CROSSTUBE. BE SURE TO ELIMINATE ANY AIR GAPS.
- 16) TORQUE CLAMPS ON D2896-1 SUPPORT 80 TO 100 IN-LB. **TORQUE CLAMPS ON D3189-1 CHAFING SHIELD 40 TO 50 IN-LB.** ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

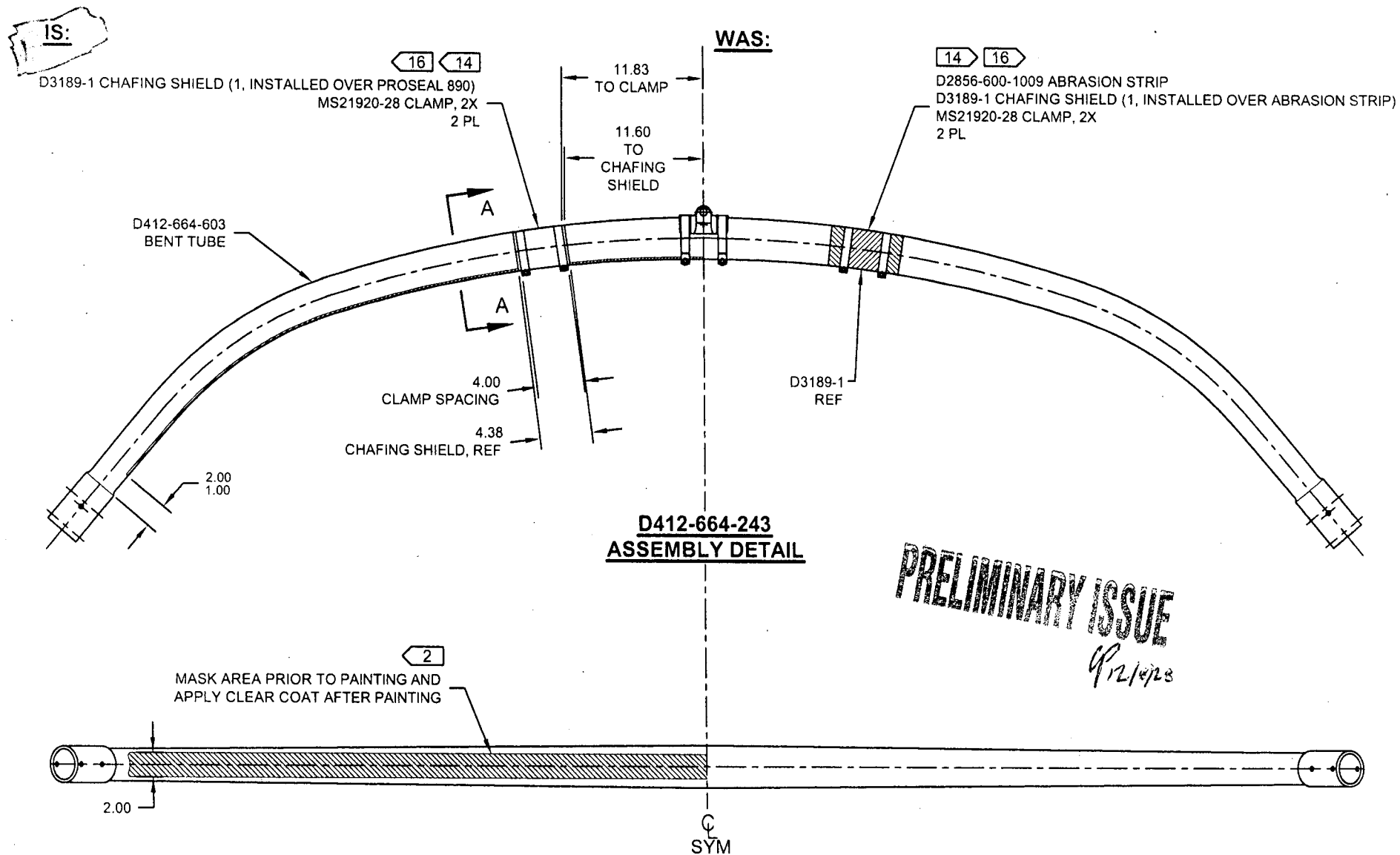
**WAS:**

- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2
- 14) INSTALL D2856-600-1009 ABRASION STRIPS WITH A 0.13 REF GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.
- 16) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

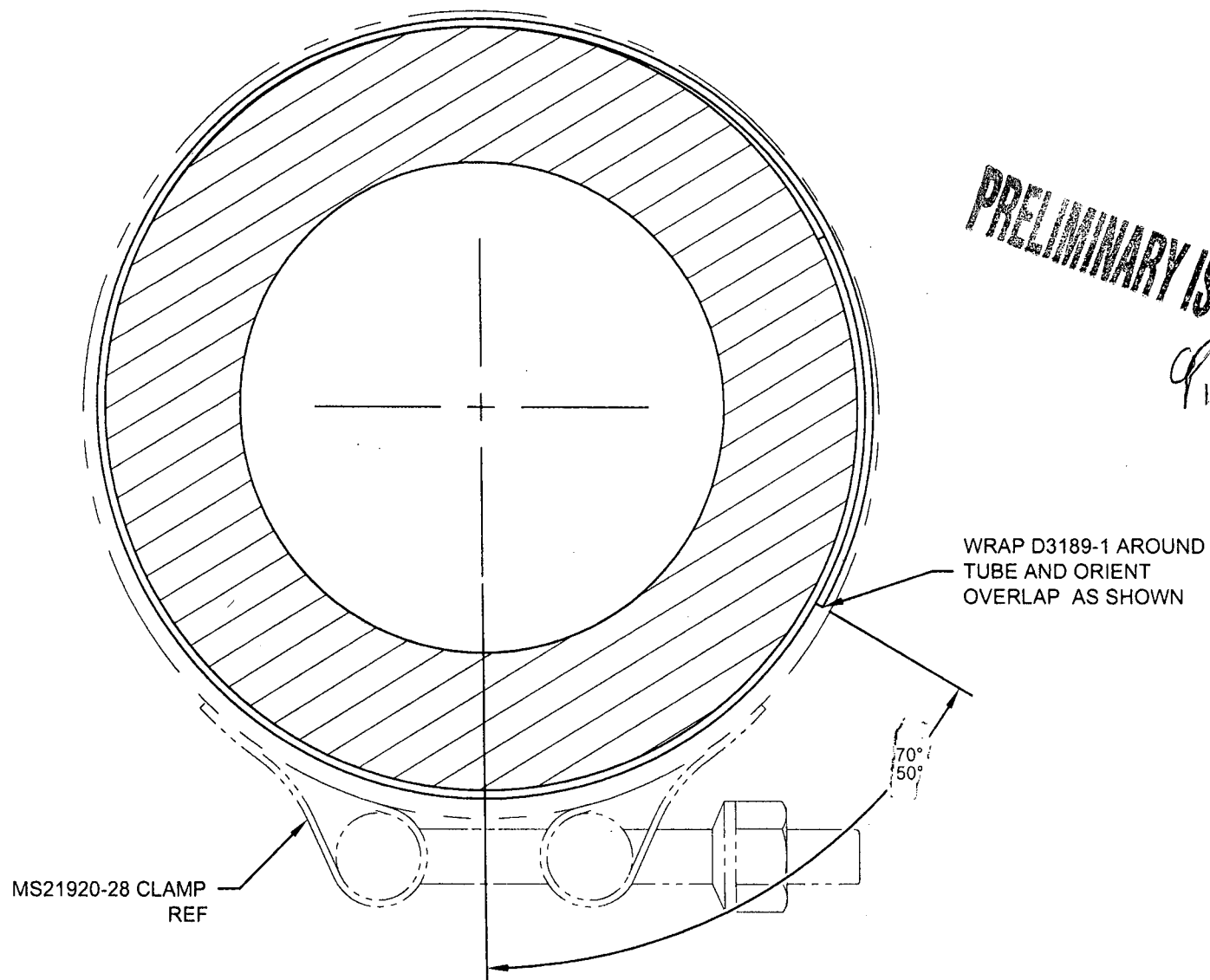
**PRELIMINARY ISSUE**

9/12/29

|                             |                                          |            |                                         |                                |                           |              |
|-----------------------------|------------------------------------------|------------|-----------------------------------------|--------------------------------|---------------------------|--------------|
| DRAWING NO.<br>D412-664-243 | TITLE<br>CROSSTUBE ASSEMBLY (412 HI AFT) | REV. E     | DART AEROSPACE LTD<br>ENGINEERING ORDER | D.E.O. NO.<br>D412-664-243-E-4 | SHEET NO.<br>SHEET 2 OF 3 | SCALE<br>NTS |
| DRAWN<br>9P                 | CHECKED                                  | MFG. APPR. | APPROVED                                | DE APPR.                       |                           |              |
| DATE<br>12.08.21            | DATE<br>12.08.21                         | DATE       | DATE                                    | DATE                           |                           |              |



|                             |                                          |            |                                                 |                                |                           |              |
|-----------------------------|------------------------------------------|------------|-------------------------------------------------|--------------------------------|---------------------------|--------------|
| DRAWING NO.<br>D412-664-243 | TITLE<br>CROSSTUBE ASSEMBLY (412 HI AFT) | REV. E     | <b>DART AEROSPACE LTD<br/>ENGINEERING ORDER</b> | D.E.O. NO.<br>D412-664-243-E-4 | SHEET NO.<br>SHEET 3 OF 3 | SCALE<br>NTS |
| DRAWN<br><i>q</i>           | CHECKED<br><i>q</i>                      | MFG. APPR. | APPROVED                                        | DE APPR.                       |                           |              |
| DATE<br>12.08.21            | DATE<br>12.08.22                         | DATE       | DATE                                            | DATE                           |                           |              |



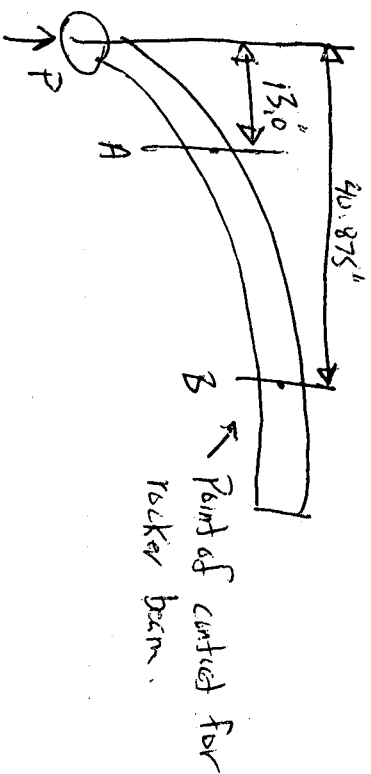
**SECTION A-A**  
CHAFING SHIELD DETAIL  
VIEW ROTATED, NOT TO SCALE

**PRELIMINARY ISSUE**  
*q 12/8/23*

CRUSHING OF D41L-664-243

11.12.06

Acceptability of 8% CRUSHING AT END OF BEND



Forces At:  $OD_1 = 2.961$ ,  $OD_2 = 2.522$  "

$CRUSHING = (2.961 - 2.522) / (2.961 + 2.522) = 8\%$   
 $I = 1.676 \text{ in}^4$  (from AutoCAD)

Forces At:  $OD_1 = 3.357$  ",  $I = 4.613 \text{ in}^4$

At:  $F = Mc/I = P \times 13 \times 2.961 / 2 \times 1.676 = 11.484 \cdot P$   
 B: "  $= P \times 40.875 \times 3.357 / 2 \times 4.613 = 14.651 \cdot P$

M.S. =  $14.651 / 11.484 - 1 = 0.27$

∴ Tube will break at rocker beam contact before area of 8% crushing, 8% crushing in area at end of tube bend is acceptable

Q 11.12.06



# Non-Conformance Report

Printed on: Wednesday, August 29, 2012

| Details                                                                                                                                                                                                  |                                                                      |                                       |                                                     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|---------------------------------------|-----------------------------------------------------|
| <b>Raised Date</b><br>8/29/2012                                                                                                                                                                          | <b>Status</b><br>Open                                                | <b>Owner</b><br>Smith, Patrick Robert | <b>Number</b><br>NCR12-1760                         |
| <b>Target Date</b><br>9/15/2012                                                                                                                                                                          | <b>Standard</b>                                                      |                                       | <b>Severity</b><br>MINOR                            |
| <b>Source</b><br>Quality Inspection                                                                                                                                                                      |                                                                      | <b>Audit</b>                          |                                                     |
| <b>Raised By Person</b><br>Downing, Eric                                                                                                                                                                 | <b>Raised Against (Department or Supplier)</b><br>Engineering\Design |                                       | <b>Fault Category</b><br>General\Documentation\Data |
| <b>Details</b><br>after installing D3189-1 chafing shield's on work orders B88094, B88093, B86985, B86986 it was found that the installtion on the drawing is not matching what is called up on the ICA. |                                                                      |                                       |                                                     |
| <b>Product</b>                                                                                                                                                                                           |                                                                      |                                       |                                                     |
| <b>Document</b>                                                                                                                                                                                          |                                                                      | <b>Root Cause</b>                     |                                                     |
| <b>Closed By</b>                                                                                                                                                                                         | <b>Closed Date</b>                                                   | <b>Resolution</b>                     |                                                     |

| Corrective Action               |                               |                    |                  |
|---------------------------------|-------------------------------|--------------------|------------------|
| <b>Target Date</b><br>9/15/2012 | <b>Owner</b><br>Petsche, Mike | <b>Closed Date</b> | <b>Closed By</b> |
| <b>Details</b>                  |                               |                    |                  |

| Actions                                                                      |                |                    |                       |
|------------------------------------------------------------------------------|----------------|--------------------|-----------------------|
| <b>Number</b>                                                                | <b>Owner</b>   | <b>Target Date</b> | <b>Completed Date</b> |
| <b>Details</b>                                                               |                | <b>Response</b>    |                       |
| 1                                                                            | Petsche, Mike  | 9/8/2012           |                       |
| open a PAR to have the drawings match what is called up on the ICAPAR #_____ |                |                    |                       |
| 2                                                                            | Lacelle, Linda | 8/31/2012          |                       |
| rework all the D412-664-203 cross tubes in stock                             |                |                    |                       |

**Verification & Review**

|                         |       |             |           |
|-------------------------|-------|-------------|-----------|
| Target Date<br>9/2/2012 | Owner | Closed Date | Closed By |
| Details                 |       |             |           |

**Actions**

|         |       |             |                |
|---------|-------|-------------|----------------|
| Number  | Owner | Target Date | Completed Date |
| Details |       | Response    |                |
|         |       |             |                |
|         |       |             |                |



# RAPPORT D'INSPECTION NON DESTRUCTIVE

(SUITE)

RAPPORT# P-12305

PAGE 2 DE 2

CLIENT Dart Aerospace  
ATTENTION Linda

DATE August 3, 2012 HEURE ☒ AM ☐ PM  
ACUREN W/O: 188-12-C0305 7:30

## RÉSULTATS

(☐ MÉTRIQUE ☐ IMPÉRIALE)

- 1) 3X D412-664-203 Crosstube AFT WO ID: B87295 - B86985 - B86986  
PT Done IAW ASTM E1417-05 Found accepted *8/2/12*
- 2) 1X D212-664-201 Crosstube AFT WO ID: B85563  
PT Done IAW ASTM E1417-05 Found accepted
- 3) 2X D206-667-103 Crosstube FWD WO ID: B88697 - B88696  
PT Done IAW ASTM E1417-05 and Found accepted
- 4) 2X D407-667-105 Crosstube FWD WO ID: B85313 - B85314  
PT Done IAW ASTM E1417-05 and Found accepted
- 5) 5X D3011-1 Rappel WO ID: 86212  
PT Done IAW ASTM E1417-05 and Found accepted

### Étendue des services

L'entente selon laquelle le Groupe Acuren Inc. Exécute les services ne concerne que les énoncés par écrit. En aucune circonstance ces services ne s'étendent au-delà de l'exécution des services demandés. Il est entendu que toutes les descriptions, les observations et les expressions d'opinions faites par Acuren reflètent les opinions ou les observations de l'entreprise fondées sur l'information et les hypothèses fournies par le propriétaire/opérateur, et elles ne constituent pas des déclarations ou des garanties ou ne peuvent être interprétées comme constituant. Le groupe Acuren Inc. N'assume aucune des responsabilités du propriétaire/opérateur, et le propriétaire/opérateur conserve la responsabilité entière des décisions prises en matière d'ingénierie, de fabrication, de réparation et d'usage à partir de l'information ou des données fournies par Acuren en rapport avec les services décrits dans les présentes ne peuvent excéder le coût des services rendus.

### Norme de Diligence

Dans l'exécution des services, le Groupe Acuren inc. Applique le degré de diligence, le soin et la compétence normalement exercés dans des circonstances semblables par d'autres fournisseurs de ce type de services opérant dans la même localité ou dans une localité similaire. Aucune autre garantie, implicite ou explicite, n'est faite ou voulue par le Groupe Acuren Inc.

## SIGNATURES

REPRÉSENTANT CLIENT

Andy Sheldon  
MOULÉ

ASheldon  
SIGNATURE

FTJ#:

TECHNICIEN (SIGNATURE):

Philippe Barre

NOM (MOULÉ):

Philippe Barre  
1<sup>er</sup> TECHNICIEN

2<sup>nd</sup> TECHNICIEN

ONGC NIVEAU 2 SNT NIVEAU 2  
ONGC N° REGISTRATION 12027

ONGC NIVEAU \_\_\_\_\_ SNT NIVEAU \_\_\_\_\_  
ONGC N° REGISTRATION \_\_\_\_\_

RAPPORT

RÉVISÉ PAR:

NOM

INITIALES